ELECTRICAL WEST

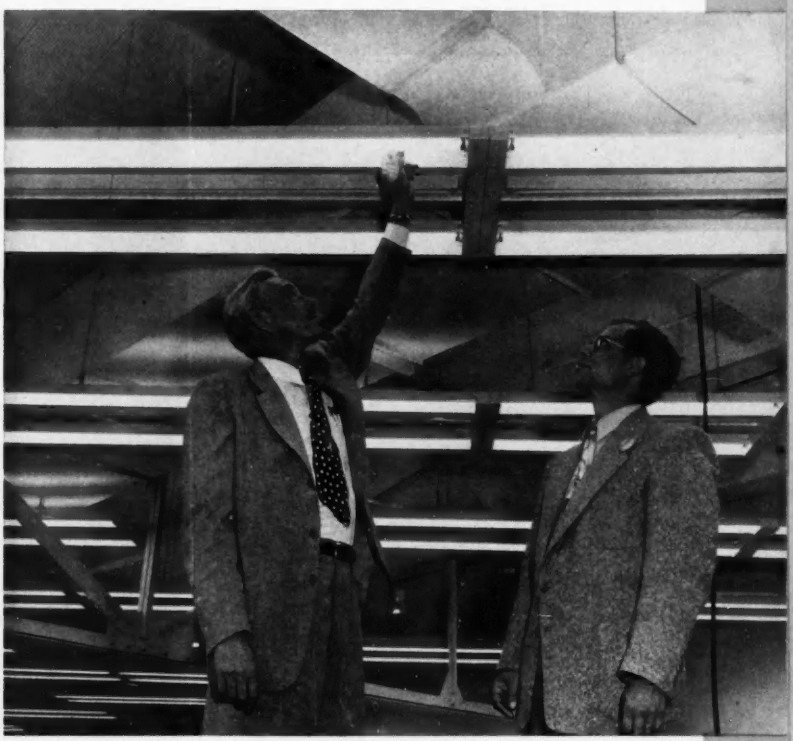
September 1952
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

AIEE in Arizona 112

The Job that Couldn't Be Done 94

Largest ACSR Conductor 96



Annual Lighting Issue

Shows Educators the Light 75

Western Lighting Installations 78

Booming Lighting for Safety 83

Light on the Law at Berkeley 84

Light for Art 85

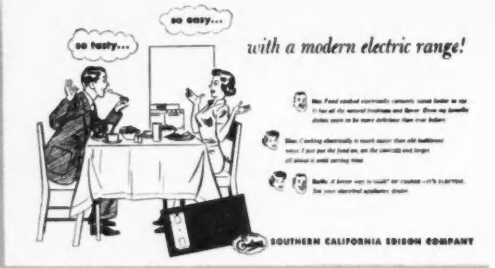
Sounds reasonable!

There are some things you can shine up, display attractively and sell to casual shoppers. But an electric range isn't one of them. Ranges aren't bought on impulse, as a general rule.

What is more, a husband's reasons and a wife's reasons for selecting a range are usually different. Tastier meals and punctual mealtimes are right down his alley. Less time in the kitchen and a mounting reputation for menu excellence are the things which ring the bell with her.

Which one should be sold? Both!

In Central and Southern California, dealers are finding this double job made easier by Edison electric range advertisements like the ones shown here. They point out the advantages of electric cooking, with both sets of reasons included.

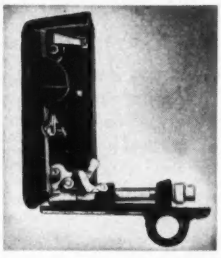


SOUTHERN CALIFORNIA EDISON COMPANY

Four cutouts in one

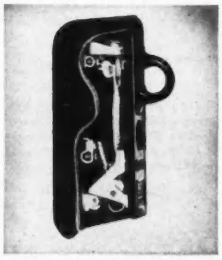
by simply changing doors

Indicating



Drop-out

Reclosing



Disconnect

A G-E FEATURE SINCE 1937! By stocking only three interchangeable doors which fit both 5.2- and 7.8-kv, 50-ampere housings, you get the 4 operating functions illustrated at the left. Available also in 100-ampere ratings, this unique flexibility reduces inventory and simplifies stocks.

INDICATING OR DROPOUT WITH A TWIST OF THE WRIST! A small wire yoke, easily inserted or removed, determines whether the fuseholder door "kicks out" at the bottom for visual indication, or drops open—either way giving positive evidence of a blown fuse.

RECLOSING DOOR AVOIDS UNNECESSARY SERVICE TRIP! The two-element reclosing door restores service within one second after a temporary fault blows the first fuse link. By saving a service trip, the two-shot cutout pays for itself the first time it operates!

FLEXIBLE DISCONNECT BLADE CAN'T GET LOST! It's fastened to the door—can't be misplaced. This disconnect blade doubles the continuous current rating of the cutout. When the blade is disconnected and the door closed, the flexible cable extends downward to indicate that the circuit is open.

WHAT'S MORE THE CUTOUT IS LIBERALLY DESIGNED—has high dielectric strength, uses silver-plated contacts, provides full-range interruption of fault currents, and is conservatively rated. All live parts are completely enclosed for maximum safety.

For complete information contact your G-E Apparatus sales representative, or write for Bulletin GEA-3448. General Electric Company, Schenectady 5, N. Y.

406-44

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

SEPTEMBER 1952

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-fifth year of publication

VOL. 109 NO. 3

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Hesten, Engineering Editor
Peggy Boyer, Assistant Editor — John Coetz, Typography

Next Month

October is our special industrial issue. Instead of a few articles on developments in major industries, there will be a number of short articles describing electrical applications in industry—applications that have increased production or solved a production problem, done a job heretofore impossible, promoted safety or in some other way brought economic benefits.

The applications came about largely as the result of the work of utility industrial power engineers assisting industries in working out their problems.

A large number of the applications naturally fall in the category of heating —high frequency, induction and resistance — but there are others ranging from use of radioactive isotopes for dispatching oil pipe-line products down to simple things such as substituting compressed air to displace steam on forging hammers, applications that are profitable to the customer and create a desirable load for the utility.

Features include a story on the new and promising 277/480-v distribution system for factories and commercial installations and information on the use of small reactors to solve the protection problem of high short-circuit currents in large industrial plants.

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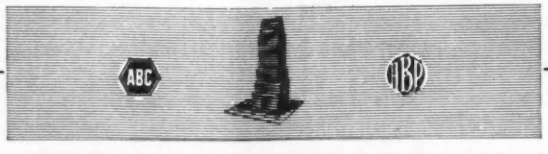
Los Angeles (17) ..... Carl Dysinger, 1111 Wilshire Blvd., MA 6-4323
New York (36) ..... Walter Klein, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, Dick Alcorn, 68 Post St., DO 2-4600



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Interrupting ratings now up to 6000 amperes at 4.8 kv, 4000 amperes at 14.4.

Complete range of nominal load ratings from 25 to 200 amperes, for 2.4 to 14.4 kv service, makes available the greatest number of sectionalizing points in this class.

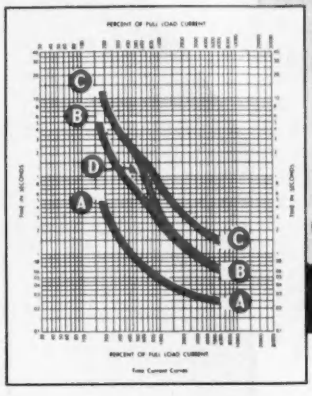
Only Recloser with:

Choice of four time-current curves, ten tripping sequences, which gives maximum flexibility in meeting all coordination problems on heavily loaded distribution circuits.

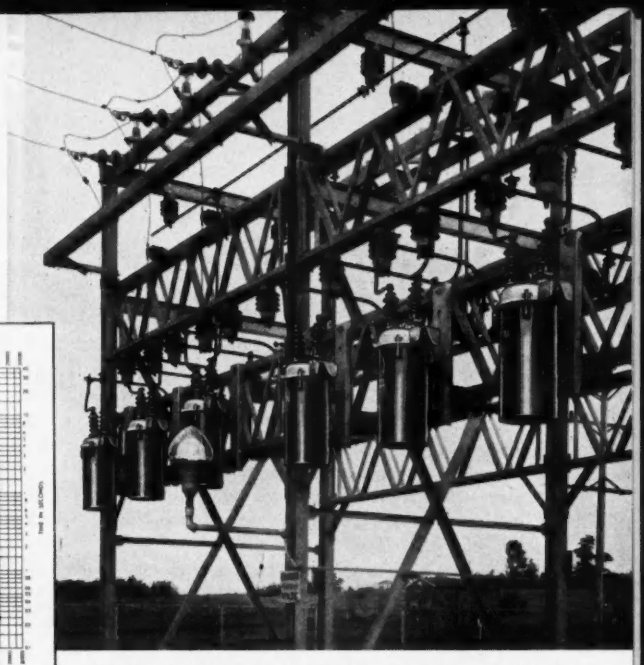
Full power-class design, with 110 kv basic insulation level.

Clamp-on bushings, with plated Universal terminals for copper or aluminum conductor.

Oil Cross Blast arc interruption insures rapid clearing of heavy faults.



Only recloser with choice of 4 time-current curves and 10 operating sequences. Coils and sequences are easily changed in the field.



Kyle Type L Reclosers at a middle-western power company substation, where they help assure uninterrupted service to an urban area.

L-M Increases Interrupting Rating, Adds 200-amp Rating to Kyle Type L Recloser

To protect substations and feeders with heavier loads and higher fault currents, L-M has added a 200-ampere rating to the Kyle Type L Recloser, and has increased interrupting ratings appreciably.

The higher interrupting ratings are based on extensive testing of production reclosers, as well as field experience, and apply to Kyle Type L Reclosers already delivered.

The new higher nominal load rating involves a new coil and some increase in the capacity of certain current carrying parts. The changes can easily be made on any Type L reclosers now in service if desired.

The Kyle Type L not only handles present heavy loads, but it offers increased capacity for the future, plus the present benefits of Type L performance and economy. It provides complete coordination with fuses and other reclosers in series, with a corresponding reduction in fuse blowing and service calls.

Heavy Duty Type L Single Phase
Nominal Rating 14.4 kv, BIL 110 kv

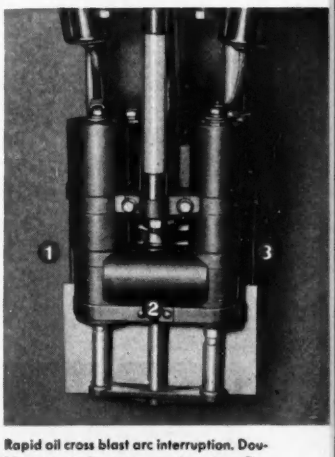
Rating Amperes	Minimum Tripping Current Amperes	Interrupting Ratings* Symmetrical RMS Amperes at Maximum Phase to Phase Nominal Voltage of: 4.8 kv	14.4 kv
25	50	1500	1500
35	70	2100	2100
50	100	3000	3000
70	140	4200	4000
100	200	6000	4000
140	280	6000	4000
200	400	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X/R ratio of not less than 8, and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

Get the Details

Ask the L-M Field Engineer for full information on the Type L and other Kyle Reclosers providing complete, coordinated protection; or write for a copy of bulletin CR-1A. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Kyle Reclosers are filled with ORTO®, L-M's oxidation-resistant transformer oil.



Rapid oil cross blast arc interruption. Double contacts draw two arcs in series. Gas from one arc at 1 blasts oil in chamber, 2, across arc at 3, extinguishing it.

LINE MATERIAL
Kyle® Reclosers

COMPLETE COORDINATED AUTOMATIC PROTECTION FROM SUBSTATION TO LOAD

99

Why did they order SPANG® CENTRAL CONDUIT *two years* before they started this 1407 Broadway Building?

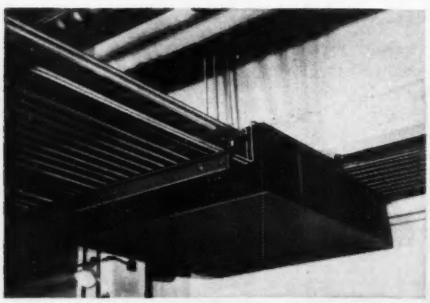
There was a *good* reason. This modern 44-story skyscraper was designed and built for tomorrow—planned to outlast the years. All materials, for instance, were selected on the basis of extra-long life and extra-reliability.

Which makes particularly significant the fact that Spang Central Conduit was specified 100%—and that the order was placed a full two years in advance to avoid substitutions.

No product ever had a finer testimonial!

This is one more example of how prominent architects, owners and electrical contractors rate the quality-controlled conduits by Spang—"Cenlaco", "Central White", "Central Black" and "Central EMT." It is additional evidence of Spang's reputation for making a truly dependable, lifetime conduit.

Remember: there *is* a difference in conduit. And you'll find Spang a *better* conduit in reliability and in cutting, bending and threading characteristics. Try it.



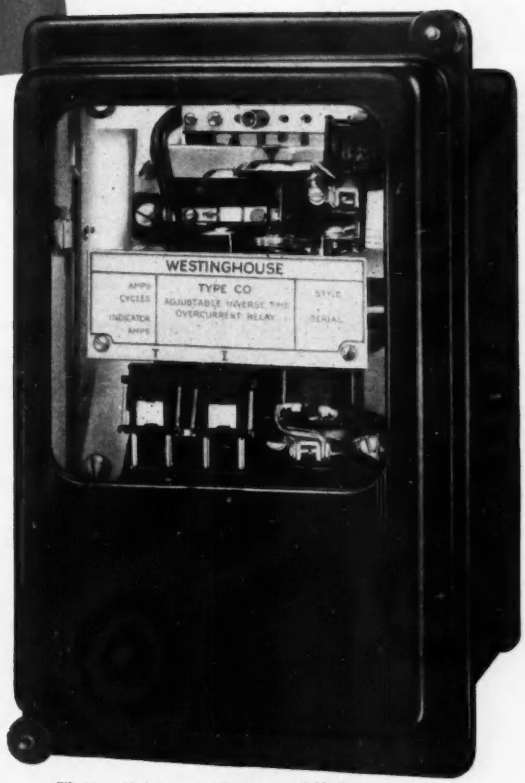
SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
PITTSBURGH 30, PA.
District Offices and Sales Representatives in Principal Cities

Owner: 1407 Broadway Realty Co., N.Y.C.
Architect: Kahn and Jacobs, N.Y.C.
General Contractor: J. H. Taylor Construction Company, Inc., N.Y.C.
Electrical Contractor: Miller-Brown, Inc., N.Y.C.

Another Westinghouse Relay Development

New CO Relay

gives greater accuracy!



The Type CO Overcurrent Relay is available in Flexitest or standard rectangular projection case.

This latest advance in design gives a degree of accuracy heretofore unattainable in an induction disc relay. The reason—a new basic relay development—the "E" element.

The "E" element has four separate and independent adjustments to make it meet existing time curves accurately—very accurately! This high degree of accuracy permits faster protection for your lines and equipment.

For further assurance of accuracy the new CO Relay offers low-wave form and low-temperature error . . . micrometer adjustment of the permanent magnet . . . constant "pick-up" at all lever settings.

Ask your Westinghouse representative to show you the new CO Relay—he'll be glad to go over it feature by feature with you—or request a demonstration by writing to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40404

YOU CAN BE SURE...IF IT'S Westinghouse

RELAYS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

ALEC

ALUMINUM SERVICE DRO

Load for load ALECTRAL aluminum service drop and entrance cable is lighter, easier to handle, more readily available and...is less costly than copper. The same is true of certain other aluminum types such as TIP-TOP® weatherproof (illustrated) and aerial power cables. The men who are responsible for specifying conductor materials have come to recognize these advantages now more than ever before.

Perhaps, today, you are confronted with a problem that ALECTRAL Aluminum conductors could completely solve. General Cable Corporation is the largest manufacturer of insulated aluminum wires and cables and is the pioneer in this field. Contact your nearest General Cable office for complete information on ALECTRAL aluminum wire and cable.

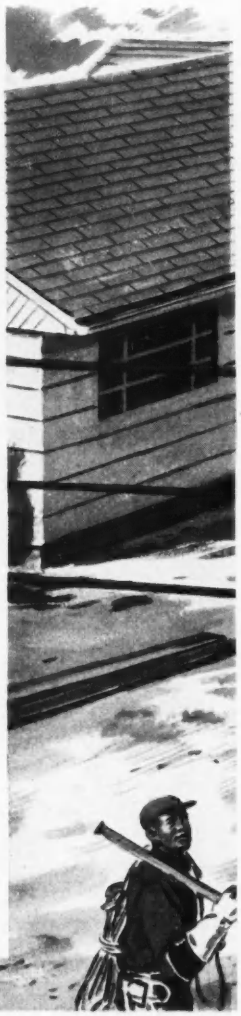
GENERAL CABLE
CORPORATION

EXECUTIVE OFFICES: 420 LEXINGTON AVE., NEW YORK 17, N. Y. • SALES OFFICES IN PRINCIPAL CITIES OF THE U. S.

• • •

CHECK THESE IMPORTANT ADVANTAGES OF ALUMINUM SELF-SUPPORTING AERIAL POWER CABLES

- ✓ **SIMPLIFIED INSTALLATION** permits lighter fittings and longer spans.
- ✓ **REDUCED TREE TRIMMING EXPENSE** Maintenance costs are lowered and highway beauty preserved.
- ✓ **GREATER SAFETY** Withstands heavier ice and wind loads.
- ✓ **CLOSER VOLTAGE REGULATION** permitted by lower reactance of cables than is normal with open-wire construction.

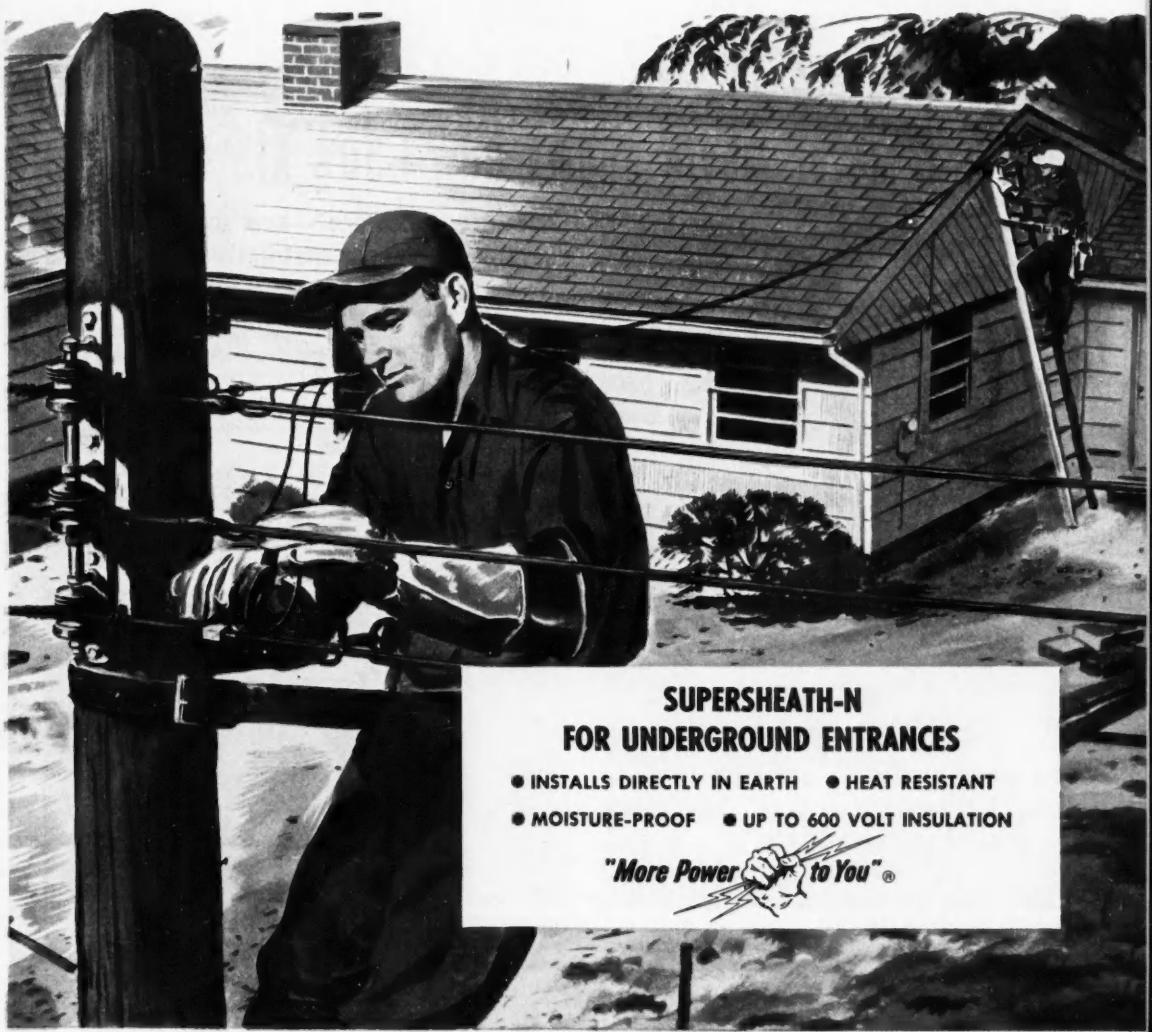


GENERAL CABLE GENERAL CABLE

PIONEERS IN ALUM

TRAL®

P AND ENTRANCE CABLE



SUPERSHEATH-N
FOR UNDERGROUND ENTRANCES

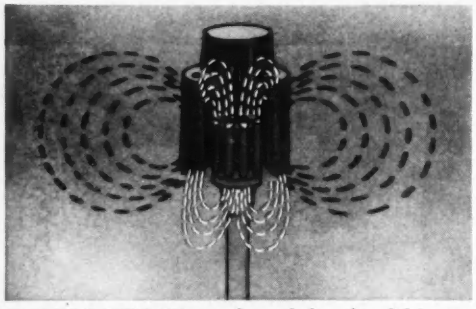
- INSTALLS DIRECTLY IN EARTH
- HEAT RESISTANT
- MOISTURE-PROOF
- UP TO 600 VOLT INSULATION

"More Power to You"®

INUM WIRE AND CABLE

QUALITY-CONTROL STAND REGULARLY TESTS SAMPLE METERS—CHECKING ACCURACY OF BOTH OPERATORS AND PRODUCTION TEST PANELS

New G-E Meter Movie Shows How I-50's Are Certified



ANIMATED SEQUENCE, one of several, shows how disk is magnetically suspended. Side thrust against guide bushings is 2000 times less than total bearing pressure of conventional meters.

"Accent on Accuracy"—new sound, color film shows development, construction of I-50 meters

General Electric's new full-color motion picture—"Accent on Accuracy"—is now available for showings by utilities. It describes the radical design developments, manufacturing techniques, and quality control procedures that have made possible factory-certification of I-50 meters.

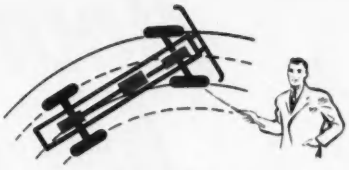
Animated sequences are included. These show the importance of meters, operation and development of the watthour meter, and how the I-50 floating disk works.

"Accent on Accuracy" is offered to any utility—both for employee information and to show customers the story behind services. If you would like to see or use this 16-mm film, call your local G-E representative or write Section: 601-83, General Electric Company, Schenectady, N. Y.

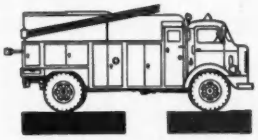
INSPECTIONS FOR CLEANLINESS are important because lint and other particles cause most performance rejects. Film shows many precautions which are taken during manufacturing.

PERMANENT LAG ADJUSTMENT is made on stator. As film shows, operator tests, then equipment automatically punches holes for permanent calibration. Process eliminates need for further adjustment.

GENERAL ELECTRIC



Fully Compensated Drive... three free-acting differentials compensate for the difference in travel of all four wheels. Reduces drive line strains, eliminates needless tire wear.

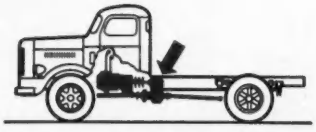


Proper Weight Distribution . . . only a true 4x4 gives you the added weight on the front wheels needed to gain the necessary traction to speed utility line work regardless of weather or terrain.

Speed Line Work...Anywhere!

only FWD has all these features for faster, more reliable line construction and maintenance

Full Torque P.T.O.... utilizes full engine power through all transmission speeds. An exclusive safety lock prevents truck drive while boring operations are proceeding.



Two-Speed Aux. Transmission

. . . doubles the number of transmission gear ratios. Provides low gear ratio for full power at extreme low speeds needed for tough, cross-country operations.

Faster, Safer, More Economical

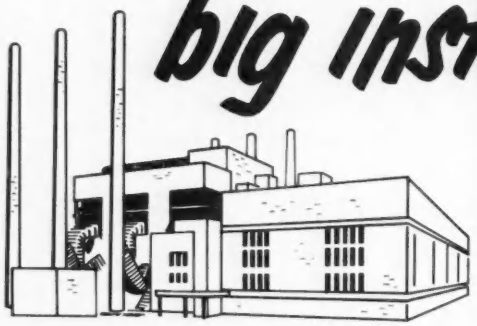
FWD "mobilized tools" for line construction and maintenance were designed with the aid of utility men for utility service. This policy of *"building in"* features that you want, results in superior equipment that gets crews and tools to the job in a hurry in spite of weather, terrain, or bad footing. See your FWD Dealer to get the facts on how FWD "mobilized tools" help keep construction on schedule . . . speed service restoration . . . earn more for your equipment dollar. THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis. — Kitchener, Ont.

Over 78 Matched Combinations

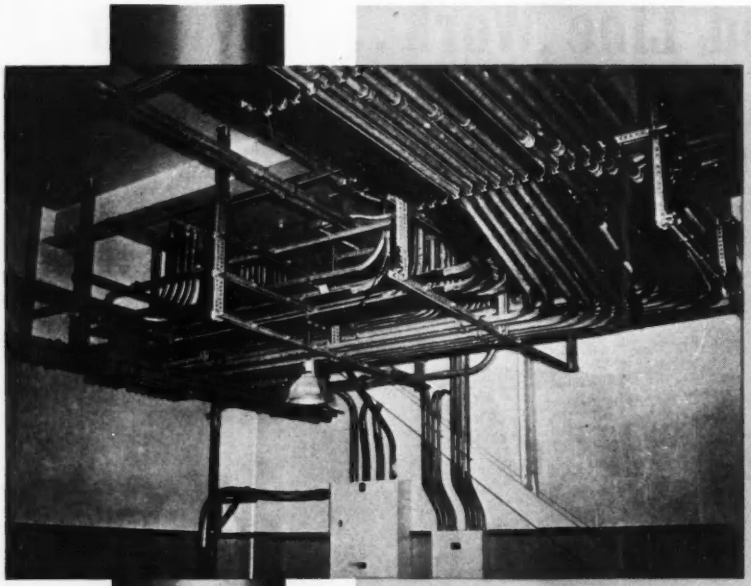
. . . Now choose the exact "mobilized tool" that meets your requirements . . . and deal with *only one* source for complete service and supply.

Built by the makers of America's Foremost Heavy-Duty Trucks

Another big installation of



Miles of Rome • EMT protect wires and cables in PG&E's new Contra Costa steam plant.



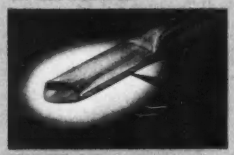
Easy to work and bend, Rome • EMT can be quickly adapted to any plant layout.

Warehouse stocks located as follows:

San Francisco, Calif.	Los Angeles, Calif.
Chicago, Ill.	Salt Lake City, Utah
Dallas, Texas	Seattle, Wash.
Denver, Colo.	St. Paul, Minn.
Torrance, Calif.	

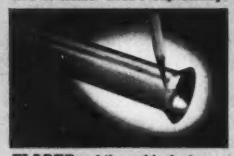
Rome • EMT is available now in the following sizes: STRAIGHT LENGTHS—½", ¾", 1", 1¼", 1½" and 2". 90° ELBOWS—¾", 1", 1¼", 1½" and 2".

SQUEEZED like an accordion by tons of pressure—yet the Rome • EMT weld holds firm proving the weld to be as strong as the tube wall itself.



FLATTENED like a pancake—actually creased along the weld. But look at the weld itself. It remains unbroken and as good as ever.

EXPANDED 25% and flared. If weld weakness existed, this test would surely find it. Yet look at it—strong as ever . . . proof positive of Rome • EMT's superiority.



FLARED while cold during a cone test. And note the weld. There's not a single indication of a break.

Rome • EMT

at Contra Costa Steam Plant

Superior Electrical Metallic Tubing affords positive protection for wire and cable in new steam plant

Pacific Gas and Electric Company used Rome•EMT for protecting miles of wire and cable in three units of its new $80,000,000 steam generating plant at Antioch, California.

MAXIMUM CORROSION AND ABRASION RESISTANCE

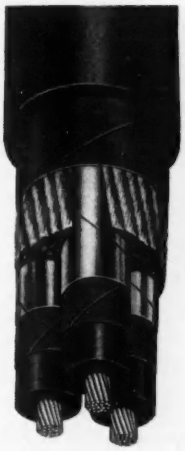
This lightweight electrical metallic tubing is used by leading electrical utilities, contractors and wholesalers throughout the West. It's tops in quality, inside and out. The electrically galvanized exterior surface with its uniform zinc coating assures utmost resistance to corrosion and abrasion. A mirror-smooth interior surface eliminates burrs and rough edges—makes it easy to fish and pull wires. Tough, precision welds stand up under the severest of breakdown tests (see photos). Diameters and wall thicknesses are made to precise tolerances. Approved by Underwriters' Laboratories, Inc., Rome•EMT exceeds *all* standards for thin wall raceways.

LOW INSTALLATION COSTS

And with Rome•EMT you're sure to keep installation costs at a minimum. Its light weight makes it easy to handle and bend. Simple compression type fittings assure snug, tight connections without time-consuming threading.

Whenever your requirements call for thin wall raceway, it will pay you to specify Rome•EMT. And, to assure dependable power distribution, always specify the superior quality of Rome wires and cables. Your nearest Rome Cable office will be glad to help you in planning your requirements.

It Costs Less to Buy the Best



Miles of Rome RoZone® for Contra Costa

In addition to supplying Rome•EMT for this new steam plant of PG&E, Rome's RoZone-RoPrene Power and Control Cables were used. PG&E also used large amounts of RoZone-RoPrene and Control Cables in its Moss Landing plant near Monterey, California.

Approved by the nation's leading utilities and consulting engineers for its well-balanced properties, RoZone merits your confidence for high or low voltage applications where dependable, long service life is paramount. Are you up to date on RoZone? Send for new catalog.

For unexcelled wire and cable performance:

RoFlex RoMarine RoBarn RoPrene® RoZone® Rome Synthinel® RoLene

WESTERN SALES OFFICES AND WAREHOUSES

SALT LAKE CITY 1, UTAH
230 South 4th West St.

LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 24, CALIF.
1100 Selby Street

SEATTLE 4, WASH.
3404 Fourth Ave., So.

DENVER 3, COLO.
1160 Eliot St.

Tip for better anchoring . . .

Build lines to stay with the CHANCE 8-Way!

Not two... Not four... but EIGHT blades

for better load distribution

This unique all-steel expanding anchor gives you "TWO four-way anchors in ONE"—Eight blades that expand into undisturbed earth *all the way around* the hole, to give more complete load distribution than any other type of expanding anchor. There is no wasted area between blades.

The Chance 8-way is extremely simple in construction. It has no expanding arms or mechanical moving parts to jam or bind during expansion. There are no bolts to cut—the holding wires shear with a single blow of the expanding bar. The eight ribbed blades cut quickly into the solid earth and expand to form a cone-shaped square.

These are reasons why Chance 8-way Anchors are preferred by many large companies who thoroughly test and prove to themselves before they buy. Another big reason is the low price of the Chance 8-way that helps to answer the problem of constantly rising line construction costs.

Get full information today—consult your Chance Catalog—compare the features, compare the costs —order from your regular supplier.

Chance 8-way Anchors are available in a complete range of sizes from 60 to 200 square inches in area for distribution or transmission line guying.

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO·

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

DID YOU KNOW?

More than 15,000,000 Chance Anchors have been put in service—*more than all other makes combined!*

* * *

The company that makes the most anchors should know the most about them. That's why you're *right* when you specify CHANCE.

C52-15A

ALLIS-CHALMERS

5/8% Step Voltage Regulators

Get More Feeder Revenue NOW!

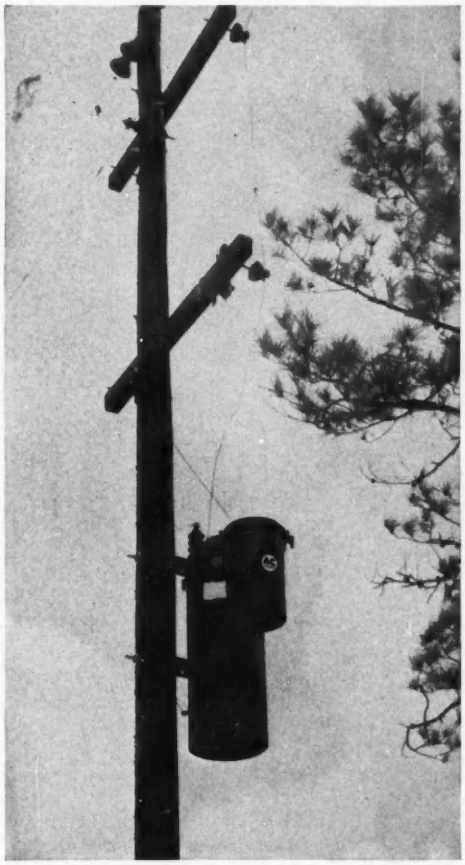
WHY LOSE REVENUE while waiting for overloaded feeders to be rebuilt? You can bring feeder voltage to maximum efficiency at low cost with Allis-Chalmers distribution regulators. And you'll be cutting out customer complaints due to low voltage.

Best of all, these regulators give you low-cost insurance against poor voltage anywhere in your system. It's easy to shift regulators from feeder to feeder as needed — mounting and placing them in operation is simple and fast.

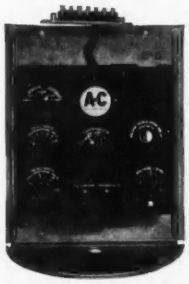
Call your nearest A-C district office to find out how you can increase revenue *now* with Allis-Chalmers distribution regulators. Or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3161

RATINGS AVAILABLE

7620 Volts—15, 50, 100 amp
5000 Volts—50, 100 amp
2500 Volts—100, 200 amp



Allis-Chalmers distribution regulator provides a narrow, accurate ± 1 volt band on a southeastern feeder.



Installation is Fast; Maintenance is Easy

"Feather-Touch" controls of Allis-Chalmers distribution regulators are one reason why installation is so fast and simple. There is only one adjustment to make: setting the voltage level. Voltage band is pre-set at the factory. A convenient calibrated scale plus a large, finger-fit knob makes setting the voltage level especially easy.

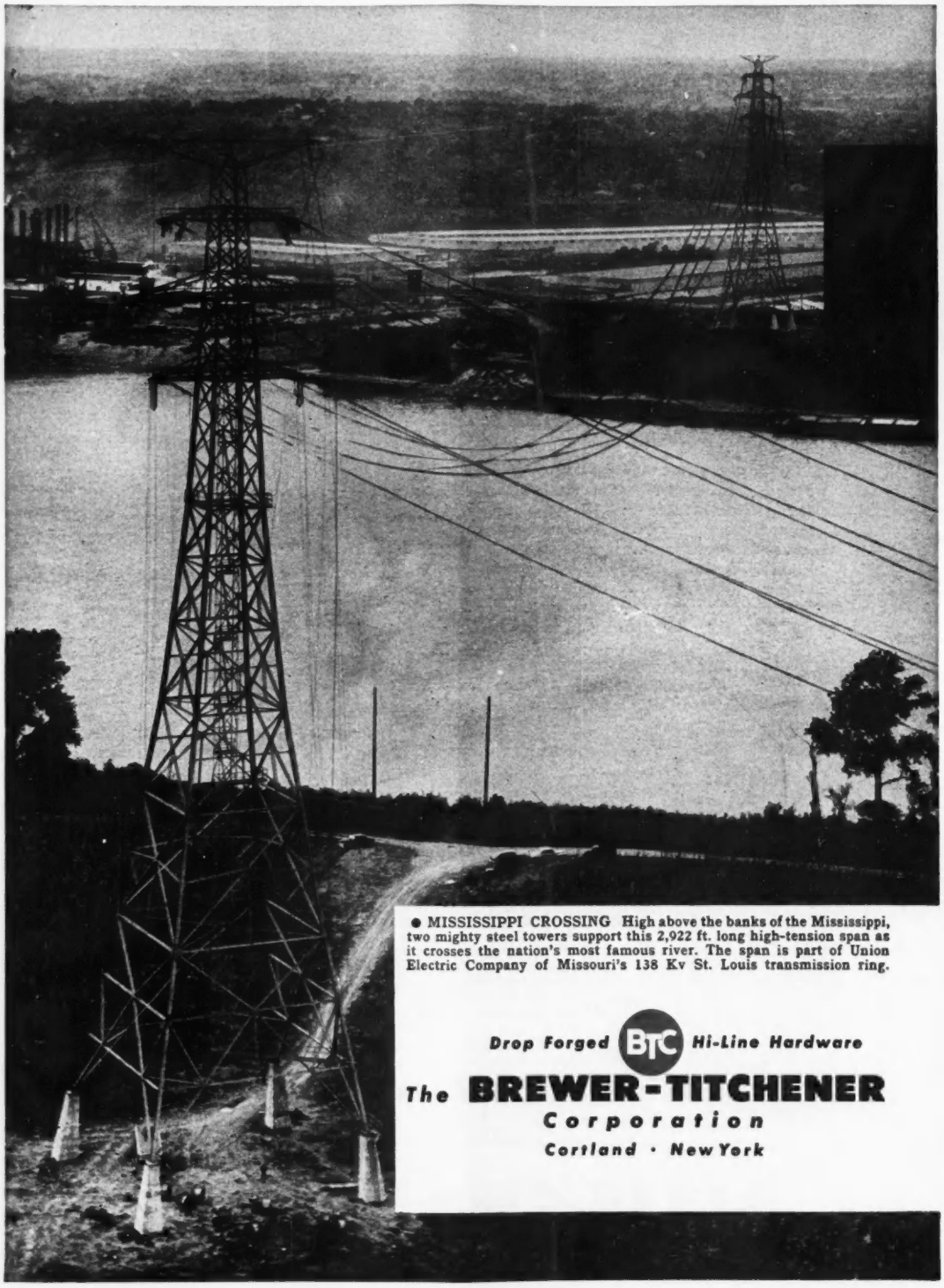
Maintenance is simplified by a single jack plug that connects all wiring to the regulator. The control can be removed and replaced in a short time. Your linemen don't have to be technical experts because the control can easily be sent back to the shop for a thorough checkup.

The complete story of "Feather-Touch" controls is contained in the booklet "Feather-Touch Controls on Allis-Chalmers Distribution Regulators," 01M7866-1. Write for it.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

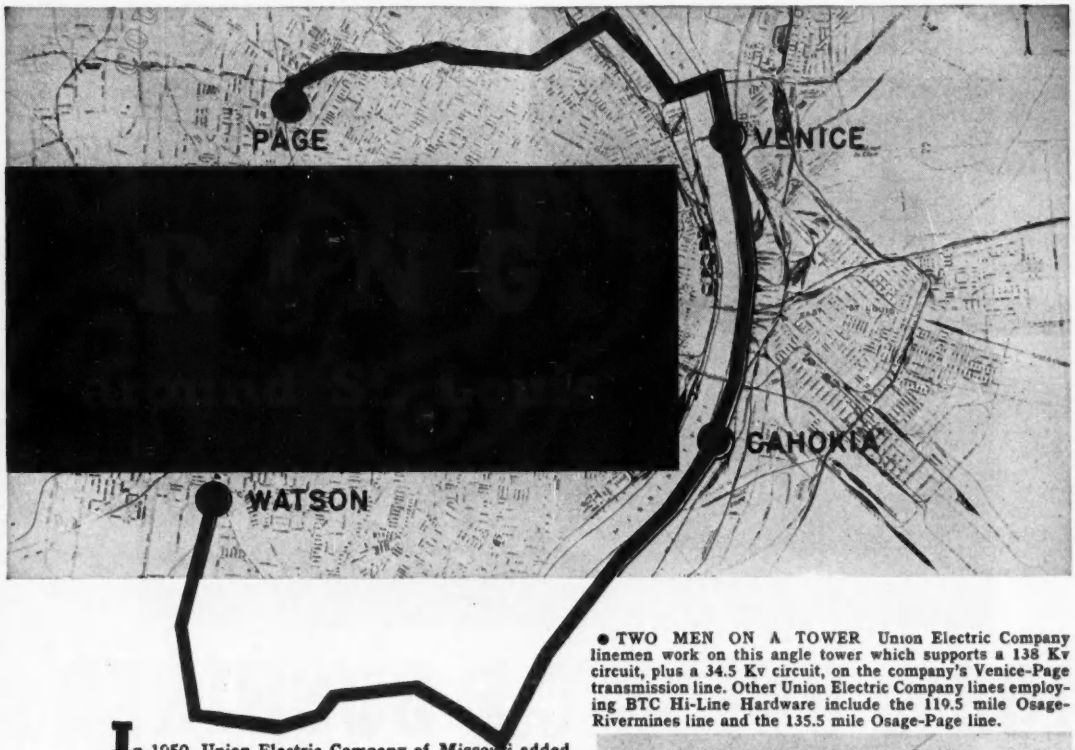
Originators of 5/8% Step Regulation



● MISSISSIPPI CROSSING High above the banks of the Mississippi, two mighty steel towers support this 2,922 ft. long high-tension span as it crosses the nation's most famous river. The span is part of Union Electric Company of Missouri's 138 Kv St. Louis transmission ring.

Drop Forged BTC *Hi-Line Hardware*

The **BREWER-TITCHENER**
Corporation
Cortland • New York

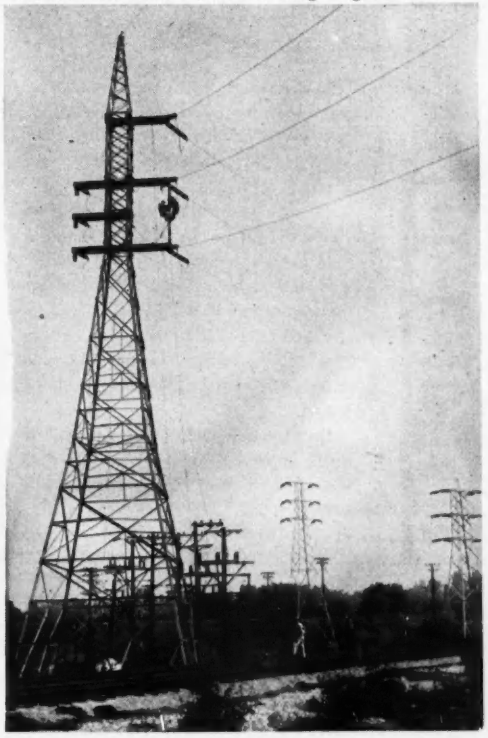


In 1950, Union Electric Company of Missouri added four new lines to its 138 Kv transmission ring around the city of St. Louis. Totaling some 46 circuit miles, these lines each have a 125,000 kva capacity . . . serve as a system tie line around the mid-west metropolis.

Union Electric Company . . . like so many of America's major power concerns . . . has used BTC Hi-Line Hardware for these links in its vital transmission ring. Insist on BTC Drop Forged Clamps and Fittings from your insulator manufacturer . . . you'll find that they're easier to install, give efficient trouble-free performance and help keep maintenance to a minimum.

Sold through your insulator manufacturer only.

● TWO MEN ON A TOWER Union Electric Company linemen work on this angle tower which supports a 138 Kv circuit, plus a 34.5 Kv circuit, on the company's Venice-Page transmission line. Other Union Electric Company lines employing BTC Hi-Line Hardware include the 119.5 mile Osage-Rivermines line and the 135.5 mile Osage-Page line.



Los Angeles STATLER HOTEL and STATLER CENTER

100% UNION C-E BUSHINGS

The mammoth new Statler Center, which includes the beautiful Statler Hotel, erected at a cost of $25,000,000 symbolizes the finest in construction, architects, engineers and materials could make it.

It was but natural that for Conduit End Bushings, Union Insulated Conduit End Bushings should be specified and used. Every Insulated Conduit End Bushing in Statler Center and Statler Hotel is UNION . . . yes 100%!

Union was FIRST to produce the moulded Insulated Conduit End Bushing, and because of this pioneering, Insulated Bushings are preferred.

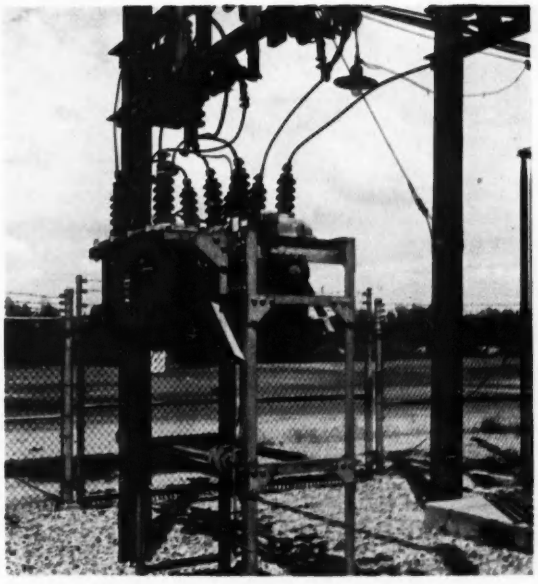
On Union Insulated Bushings, the inside lip is beveled to remove cutting edges, making wire pulling easy. They economically prevent costly grounds and short circuits. For the best in Insulated Conduit End Bushings specify UNION.

UNION INSULATED CONDUIT END BUSHINGS ARE OFTEN COPIED BUT NEVER EQUALED.

UNION INSULATING CO.

PARKERSBURG, WEST VIRGINIA

The greatest recloser development since Kyle pioneered dual timing



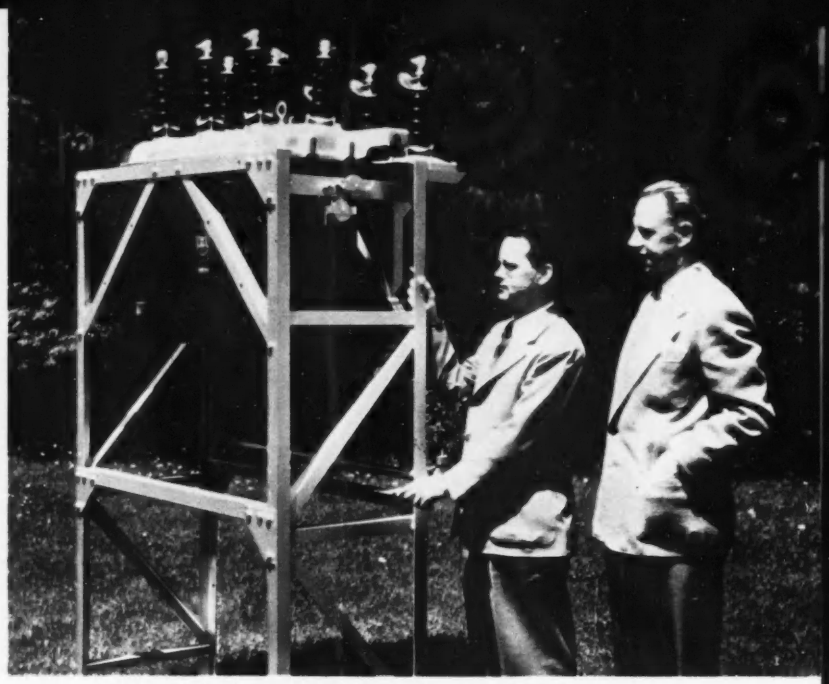
A Type R Recloser at St. Joe substation of Indiana-Michigan Electric Company, Ft. Wayne; and, above, a pole-mounted Type R on the lines of a southwestern power company. The Type R gives 3-phase protection up to 100,000 kva, as described in the following pages.

First 3-phase power-class recloser with 100,000 kva interrupting rating.

Completely self-contained unit provides automatic protection of substation feeders at less than half the cost of using substation breakers. Also used on feeder lines with heavy loads and high fault currents.

Available with ground trip solenoid and current transformer.

All three phases trip simultaneously when fault occurs on any one phase, preventing feedback.



A. Van Ryan (right), Director of New Products Development, and R. C. Kirk, Manager, Kyle Products Sales, demonstrate the new Kyle Type R Recloser, shown with ground trip solenoid and current transformer, at right, in mounting frame for substation use. Also available with frame for pole mounting.

L-M Announces Kyle Type R 3-phase Heavy Duty Recloser

By **R. C. KIRK,**
Manager, Kyle Products Sales, Line Material Company

To meet the growing need for power-class protection on 3-phase lines, L-M engineers have developed a heavy-duty recloser that provides simultaneous tripping of all three phases on feeders with heavy loads and high fault currents.

This is a new and very desirable feature in heavy-duty 3-phase reclosers. It prevents high transient voltages sometimes encountered with single-phase switching on delta systems; and on wye systems it prevents feedback which might cause trouble on heavily loaded 3-phase circuits.

6000 Amperes Interrupting Rating

This recloser, known as the Kyle Type R, is a rugged, dependable unit capable of replacing breakers in substations with up to 100,000 kva fault capacity. The recloser is rated 25 to 280 amperes nominal load, trips at from 50 to 560 amperes, and interrupts up to 6000 amperes at 4.8 kv, or 4000 amperes at 14.4 kv.

Ground Fault Tripping

The Type R is available with a current transformer and ground trip solenoid that will trip the recloser at from 50 to 400 amperes.

This new Kyle Type R has been in continuous use in substation and pole line applications of several power companies for a period sufficient to substantiate design calculations and the extensive tests in the "Know House," L-M's short-circuit test laboratory.

Provides Dual Timing

Because it interrupts so much faster than breakers, the Type R permits co-ordination with fuses, eliminating unnecessary fuse blowing on temporary faults and thus substantially reducing service calls.

KYLE Type R Series Trip Coil Ratings

Nominal Load Rating Amperes	Minimum Tripping Current Amperes	Interrupting Rating* Symmetrical RMS Amperes at Maximum Phase-to-Phase Nominal Voltage of: 4.8 kv	14.4 kv
25	50	1500	1500
35	70	2100	2100
50	100	3000	3000
70	140	4200	4000
100	200	6000	4000
140	280	6000	4000
160	320	6000	4000
185	370	6000	4000
225	450	6000	4000
280	560	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X/R ratio of not less than 8, and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

Closing Solenoid Voltage Ratings in complete range from 2.4 to 14.4 kv.

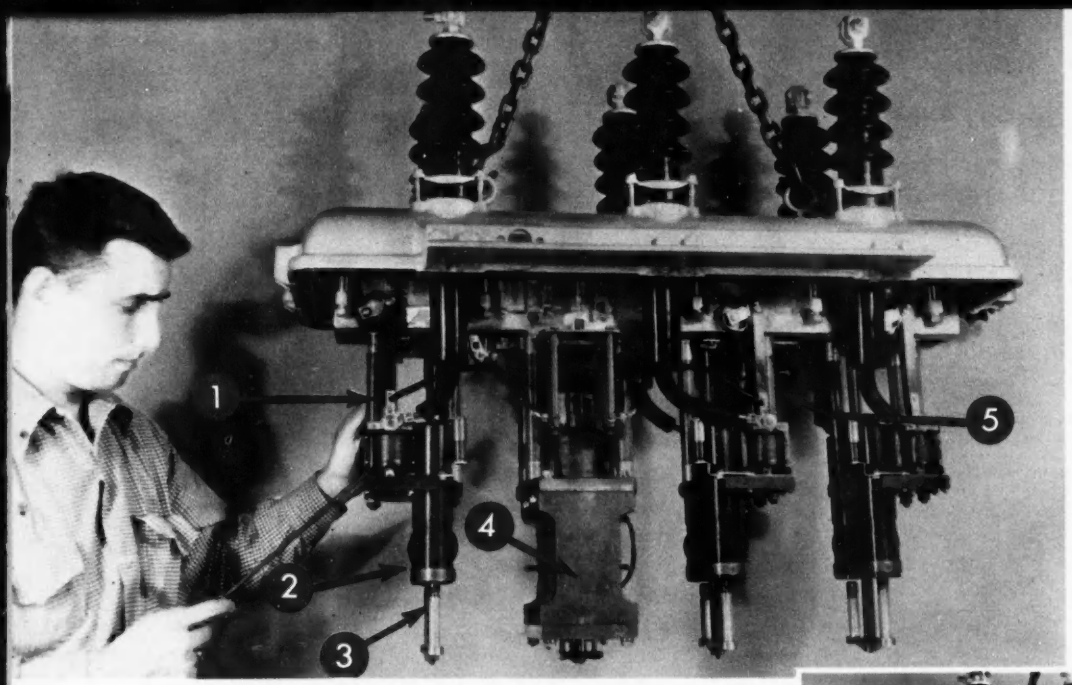
The 160 and 225 ampere ratings are available for special coordination problems. When either of these two ratings is used in series with other reclosers, minimum trip currents should have a ratio of not less than 1.32 for best coordination.

Ground Solenoid Settings: Minimum Pickup Current primary, amperes; 50; 67; 100; 133; 200; 400.

Three time-current curves; A, fast; B, retarded; C, extra-retarded. Available in any of seven sequences.

Trip coils, closing coil, and sequences easily changed in the field.

Insulation Level: full power class; meets ASA, NEMA, AIEE standards for 15 kv station equipment, as follows:
60 cycle one-minute withstand, dry: 50 kv
60 cycle ten-second withstand, wet: 45 kv
1½ x 40 ms surge withstand (BIL): 110 kv



Open view of the completely self-contained Type R recloser. Les Larson, Assistant Design Engineer, points to one of the series trip solenoids. Photo also shows (1) tripping linkage; (2) one of the oil cross blast arc extinction chambers; (3) contact structure (contacts in open position); (4) closing solenoid; (5) ground trip solenoid (on opposite side).

Applications for the Type R

Because of its operating advantages, the savings it affords in service calls, and its low cost in comparison with substation breaker equipment, this recloser will no doubt replace breakers in many cases. The low cost is possible because the Type R is a single, self-contained unit, designed, manufactured, and tested on a standardized basis, with all the economies this implies. It will also be used in many line locations where heavily loaded 3-phase feeders justify this protection.

Complete Automatic Protection

With this new unit, Line Material now offers a complete range of automatic protection, with both single-phase and 3-phase reclosers, in the entire range up to 6000 amperes interrupting rating at 4.8 kv, and 4000 amperes at 14.4 kv. Thus L-M now provides complete, coordinated automatic protection from substation to load.

DESIGN AND OPERATING FEATURES

Operation completely automatic. On permanent faults recloser opens and recloses three times, and then locks out. On temporary faults the fast openings permit the fault to clear; if it is not cleared, the time delay operation blows the sectionalizing fuse, and the recloser resets itself for another complete cycle. Type of fault—3-phase, single-phase, or phase-to-ground—does not affect the timing.

Time Delay System, located above oil level and is Silicone fluid filled.

Operating curves: A, fast; B, retarded; C, extra-retarded. Seven possible standard sequences or combinations. Sequences easily changed in the field.

Dual Contacts, with oil cross-blast arc extinction which has proved so successful on the Kyle Type L.

Clamp-on bushings, easily replaced; plated "Universal" terminals for both copper and aluminum, No. 6 solid to 250 MCM stranded conductor.

Kyle non-reclosing feature, for extra safety, standard equipment.

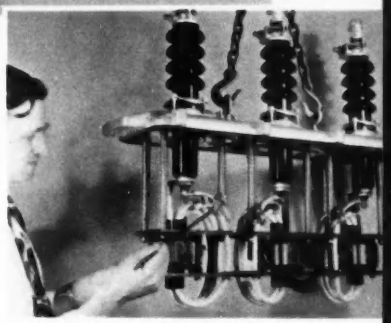
Operating handle, counter, and non-reclosing feature lever easily accessible under sleet hood. Trip-free operating handle.

Let Us Answer Your Questions

Ask the L-M Field Engineer for a copy of Bulletin CR1C —or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

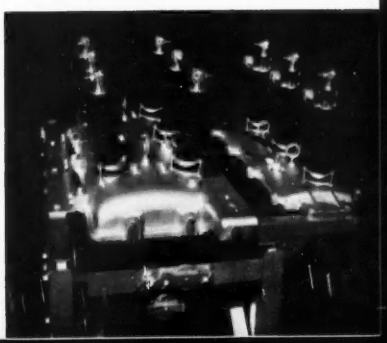
LINE MATERIAL

Kyle Reclosers



3-phase oil-filled current transformer, used with ground trip solenoid for ground fault tripping. Primaries are connected one in each phase through coaxial bushings, and secondaries are in parallel. If the three primaries have unbalanced currents, an unbalanced current will flow in the secondaries and energize the ground trip coil, which then operates the recloser in the same manner as the series trip coil.

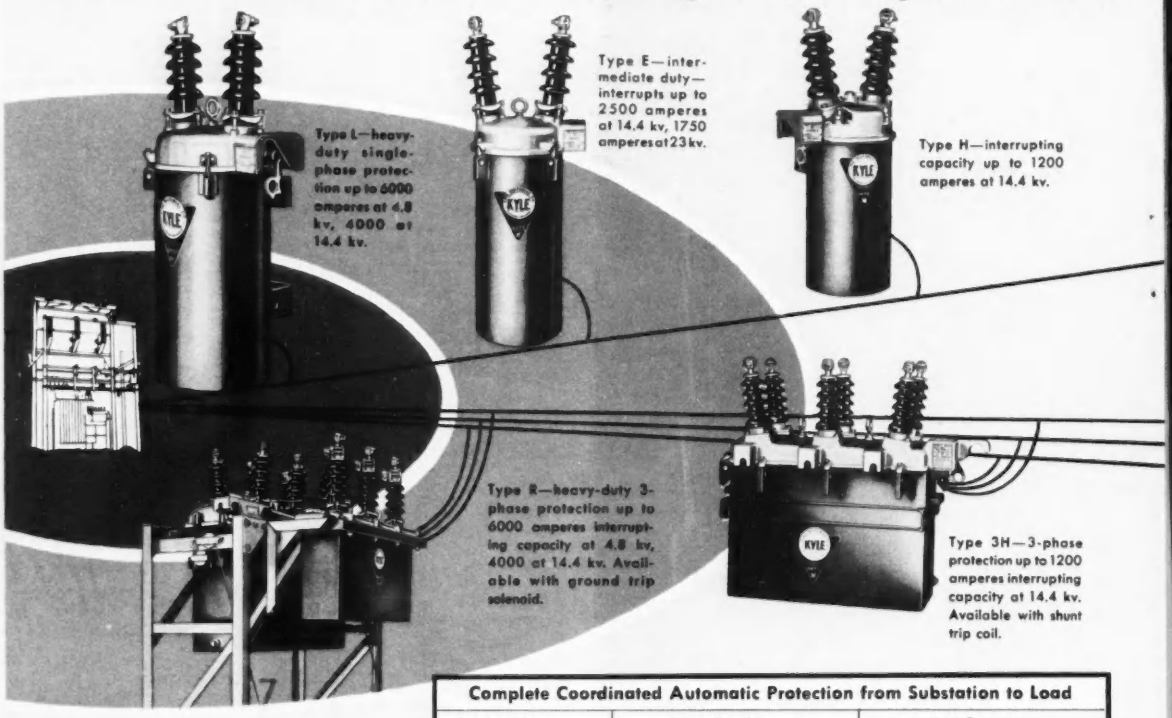
Top view of Type R recloser connected to TR transformer at right, in substation mounting frame. Both transformer and recloser are filled with ORTO®, L-M's oxidation-resistant transformer oil. Oil filler plug with ¾" standard thread, located on top of tank, has dip-stick attached.



L-M now offers

Complete Automatic Recloser Protection

from Substation to Load—for single and 3-phase lines


Type L—heavy-duty single-phase protection up to 6000 amperes at 4.8 kv, 4000 at 14.4 kv.
Type E—intermediate duty—interrupts up to 2500 amperes at 14.4 kv, 1750 amperes at 23 kv.
Type H—interrupting capacity up to 1200 amperes at 14.4 kv.
Type R—heavy-duty 3-phase protection up to 6000 amperes interrupting capacity at 4.8 kv, 4000 at 14.4 kv. Available with ground trip solenoid.
Type 3H—3-phase protection up to 1200 amperes interrupting capacity at 14.4 kv. Available with shunt trip coil.

New Kyle heavy-duty Type R 3-phase recloser makes L-M first to offer a complete, coordinated line

As shown in the illustration, L-M now provides complete automatic protection from substation to user, in both single-phase and 3-phase recloser units.

The new Kyle Type R provides up to 100,000 kva interrupting capacity—up to 6000 amperes—ample for a good-sized substation or for heavily loaded feeders with high fault currents. The Kyle Type 3H completes the 3-phase line with up to 1200 amperes interrupting capacity.

In single-phase, the Kyle Type L provides up to 6000 amperes, for substation or heavily loaded feeders; the Type E covers the range from 1200 to 2500 amperes, and the Type H provides single-phase protection up to 1200 amperes.

Ask the L-M Field Engineer for information and bulletins on the complete Kyle line; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Complete Coordinated Automatic Protection from Substation to Load

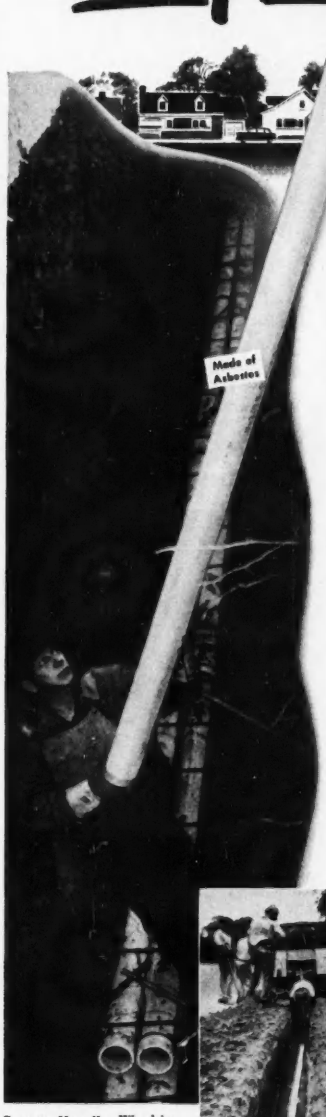
Distribution Class Nominal Voltage Rating 14.4 kv BIL 95 kv			Intermediate Duty Nominal Voltage Ratings 23 kv BIL 150 kv				Heavy Duty Nominal Voltage Ratings 14.4 kv BIL 110 kv			
Single-Phase Type H Three-Phase Type 3H			Single-Phase only Type E				Single-Phase Type L Three-Phase Type R			
Rating Amps.	Min. Trip	Inter. Rating* 14.4 kv	Rating Amps.	Min. Trip	Inter. Ratings* 14.4 kv	23 kv	Rating Amps.	Min. Trip	Inter. Ratings* 4.8 kv	14.4 kv
5	10	150	5	10	200	125	....	...	....	....
10	20	250	10	20	400	250	....	...	....	....
15	30	375	15	30	600	375	....	...	....	....
25	50	600	25	50	1000	625	25	50	1500	1500
35	70	840	35	70	1400	875	35	70	2100	2100
50	100	1200	50	100	2000	1250	50	100	3000	3000
			70	140	2500	1750	70	140	4200	4000
			100	200	2500	1750	100	200	6000	4000
							140	280	6000	4000
							160#	320	6000	4000
							185#	370	6000	4000
							200**	400	6000	4000
							225#	450	6000	4000
							280#	560	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X–R ratio of not less than 8 and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.
#Available in three-phase Type R only. **Available in single-phase Type L only.

For Ground Fault Tripping: Type R heavy-duty 3-phase recloser is available with built-in ground trip solenoid and auxiliary current transformer. Type 3H is available with a shunt trip coil which may be used for ground fault tripping with suitable auxiliary equipment.

LINE MATERIAL Kyle® Reclosers

Easy to install...



That's why TRANSITE DUCTS save time, labor and money

THESE "ON THE JOB" photographs show why savings begin right at the start of the installation when you use Transite* Ducts.

The light weight of Transite Conduit and Korduct permits hauling a substantial footage of duct per truck. Handling is fast, too, because the asbestos-cement composition of Transite Ducts makes them strong and tough. The longer length of each duct . . . 10 feet . . . reduces the number of joints in the completed line. And joints are quickly made with the Transite Tapered Coupling that is engineered to stay tight in service.

For the full story of how Transite Ducts can reduce your cableway costs, write Johns-Manville, Box 60, New York 16, New York.

4 OTHER REASONS WHY TRANSITE DUCTS DO A BETTER JOB AT LESS COST:

1. Corrosion-Resistant. Transite, being made of inorganic asbestos and cement, resists corrosion and is immune to electrolysis.

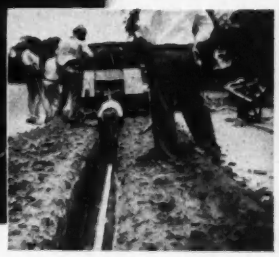
2. Permanently Smooth Bore. Transite makes long cable pulls easy. Danger of damage to cables is also minimized.

3. Incombustible. Transite will not burn nor contribute to formation of smoke, gases, or fumes . . . confines burn-outs and protects adjacent cables permanently.

4. Higher Thermal Conductivity. Cables run cooler in Transite, reducing I^2R losses, increasing current capacity and prolonging insulation life.

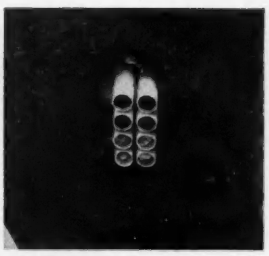
Easy to Handle: Working in a deep trench, this man finds that the light weight of Transite Ducts helps him work without undue strain.

*Reg. U. S. Pat. Off.



Speeds Installation: Transite Ducts are joined so rapidly that the assembly man can often follow right behind the trencher . . . as shown in this installation.

Speeds Distribution: The light weight of Transite Conduit enables the contractor to haul a large number of ducts per truck and speed distribution on job site.



Cuts Manhole Costs: Concrete will be poured directly around these Transite Ducts to form the manhole wall, a time and material saving made possible by Transite's strength.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

SAVES SPACE!

SAFETY m.i. WIRING* with fittings to connect to standard boxes and equipment

**Exclusively A General Cable Product*

SIZES 16 TO 4/0 A.W.G. | SIZES 16 TO 4 A.W.G. | SIZES 16 TO 4 A.W.G. | SIZES 16 TO 6 A.W.G. | SIZES 16 TO 10 A.W.G.

SAFETY m.i. WIRING SYSTEM PROVIDES ADVANTAGES NEVER BEFORE ACHIEVED!

SAFETY m.i. WIRING

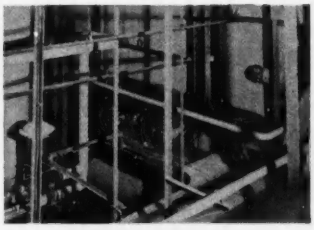
...with smaller diameter, fits readily into small or restricted spaces.

A Safety mineral insulated Wiring circuit can be installed around bends, corners, or on vertical risers without the use of additional accessories. As machine wiring it can be trained in tight quarters... too tight for any wire of larger diameter.

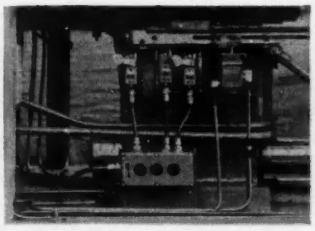
Yes, Safety m.i. Wiring, enclosed in its integral conduit-sheath, is a definite space saver in addition to all of its other special advantages. Space bottlenecks are eliminated and installations are made quickly and economically.

So unusual are the advantages of this new General Cable product, and so important are they to you, that you will want to know more about it. For full details, write your nearest General Cable office.

"More Power to You"®



The space saving advantages made possible by the small outside diameter of all Safety m.i. Wiring are well demonstrated by this control board installation in a large chemical plant.



Here is a close-up of a Loewy-Hydropress machine using Safety m.i. Wiring. Note the smooth surface — so easy to keep clean. Its small diameter saves space and insures neatness.

GENERAL CABLE
CORPORATION

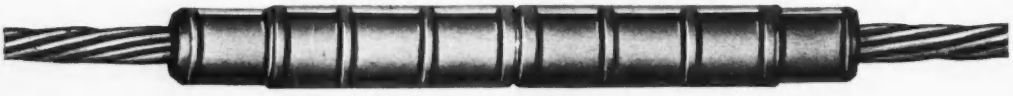
EXECUTIVE OFFICES: 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK SALES OFFICES IN PRINCIPAL CITIES OF THE UNITED STATES

Nicopress

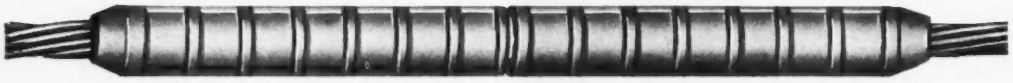
FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

**Light in weight—Holds full strength of conductor—
High in conductivity**

Completed NICOPRESS Splice on 4/0 Copper Conductor



**Completed NICOPRESS Splice on 3/8″ Extra High Strength
Copperweld Strand**



**Completed NICOPRESS Splice on 3/8″ Extra High Strength
Galvanized Steel Strand**

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

THE NATIONAL TELEPHONE SUPPLY COMPANY

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

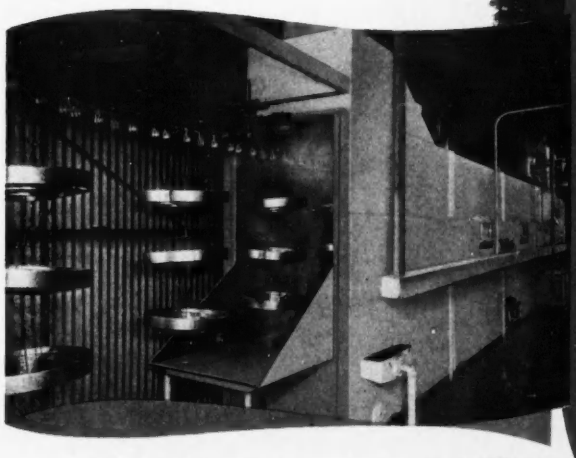
Good Lighting

as important as your most important tool!

Just imagine the level of production you'd get in a blacked-out plant—or with illumination that is inadequate or worked only at whim. It's important —as important as fine tools and skilled men— to make sure your plant is equipped with lighting that won't let you down!

Smoot-Holman lighting equipment is built to specifications that do not compromise with quality. Whenever called upon, it dependably delivers the right amount of illumination in the right places. It relieves eye-strain, reduces fatigue—promotes accuracy on close tolerance jobs.

You take pride in your equipment and workers— why not add to their performance with Smoot-Holman lighting?



Yes we're proud of our precision "tools" too. Here raw metal is being treated against rust and corrosion in one of the finest high temperature chemical baths in the Nation.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA ®
MADE IN U.S.A.

SMOOT-HOLMAN COMPANY Inglewood, Calif Offices in Principal Western Cities • Branch and Warehouse in San Francisco

Here's ONE OIL that's right for ALL of your oil-filled electrical equipment

It's the right oil for your transformers and voltage regulators because its resistance to oxidation is so great that it will outlast conventional oil many times over. On its record to date, the service life of Shell Diala Oil AX is estimated at up to 50 years!

It's the right oil for your switches and circuit breakers because it has unexcelled carbon-settling properties. Your assurance of that lies in a special control which Shell has installed in the manufacture of Shell Diala Oil AX.

SHELL®

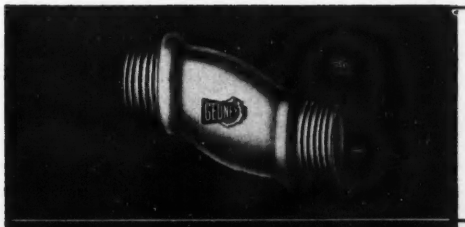
Cut down your inventory...cut down your maintenance costs...switch to this one oil that's right for all of your oil-filled electrical equipment
SHELL DIALA OIL AX

FOR OFFSET NIPPLES, NO-THREAD FITTINGS, CONDUIT BODIES . . .

GEDNEY *ALWAYS!*

YOU CAN ALWAYS rely on Gedney Fittings to cut *installed costs* and save real money. For Gedney Fittings are always accurately machined and threaded . . . smooth finished, with no burrs or metal particles . . . quick and easy to install . . . made of unbreakable malleable iron. . . . For best profits, order Gedney Fittings, always!

TYPICAL OF THE FULL GEDNEY LINE OF MALLEABLE IRON FITTINGS ARE:

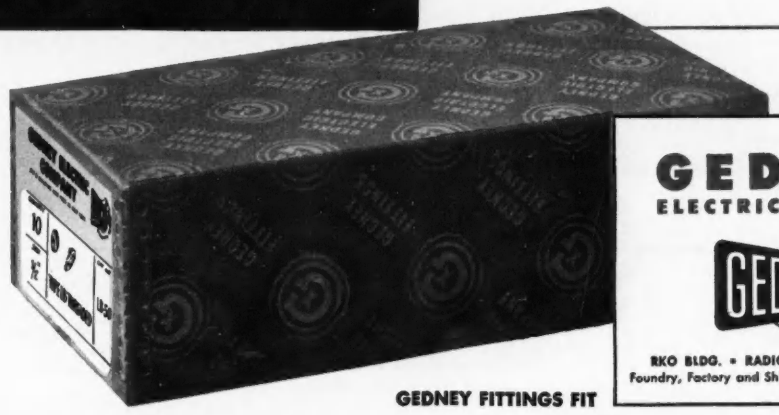


Offset Nipples in sizes from ½" to 2", with ¾" offset. Cadmium plated.

A wide choice of No-Thread 90° Elbows for rigid conduit, and of No-Thread Couplings and Connectors for Sealtite* conduit — all cadmium plated.

*Trade Mark—The American Metal Hose Branch of The American Brass Co.

Conduit Bodies in a full range of types and sizes for heavy wall rigid conduit—hot dip galvanized.

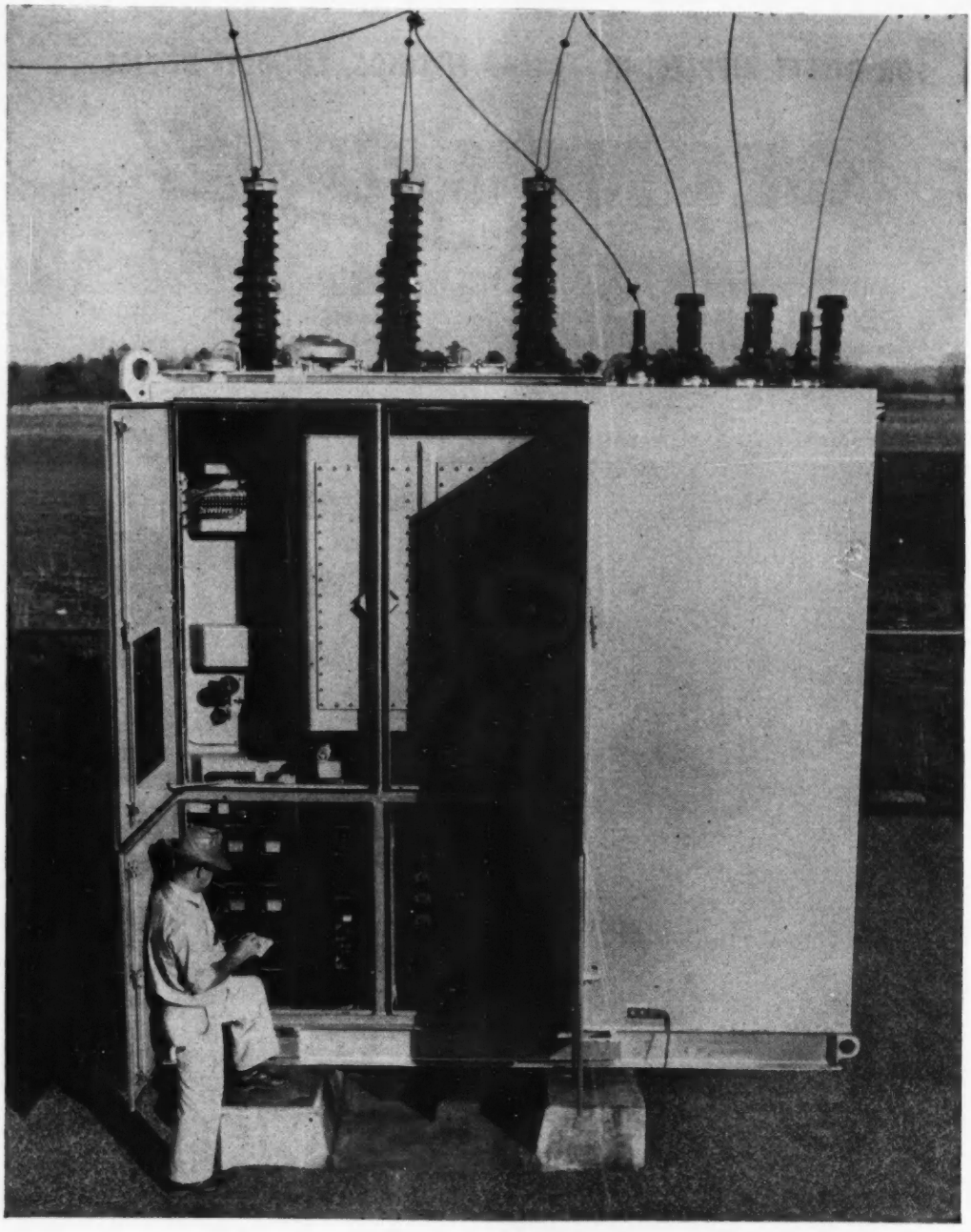


GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.



Eliminate field assembly problems...

cut substation costs!

It's a recognized fact that any evaluation of total equipment costs must include *installation, operation* and *maintenance.* Westinghouse "CSP®" Power Transformers, like this one installed on Alabama Power Company lines, are designed to reduce costs in all three.

Here's how:

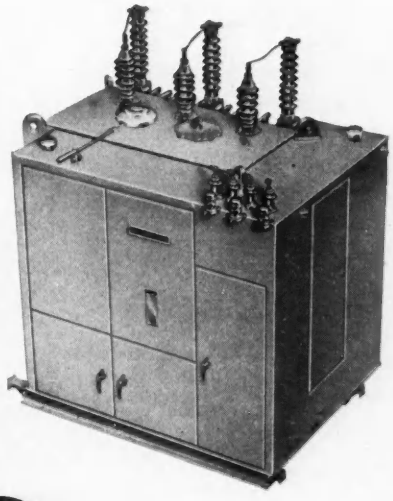
Installation. Because it's a complete-package unit, it eliminates costly field equipment co-ordination and assembly problems. Overhead structures are optional; a single foundation mat is sufficient. Real estate is less of a problem, too: Because it's neat, it overcomes community objections. Because it's safe, costly fencing may be eliminated. Because it's compact, it requires a smaller plot of land.

Operation. Maximum service continuity is assured by internal 3-way protection against lightning, surge voltages and fault conditions . . . by a greater capacity for handling emergency overloads . . . by automatic tap changing under load.

Maintenance. They need less maintenance than any other type of single-circuit substation. Totally-enclosed construction reduces all interruptions. All operating parts are easy to reach through dead-front doors . . . no climbing is required for normal maintenance.

Get facts about more savings from your Westinghouse representative. Or write for Booklet B-4692, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70645



YOU CAN BE SURE...IF IT'S Westinghouse

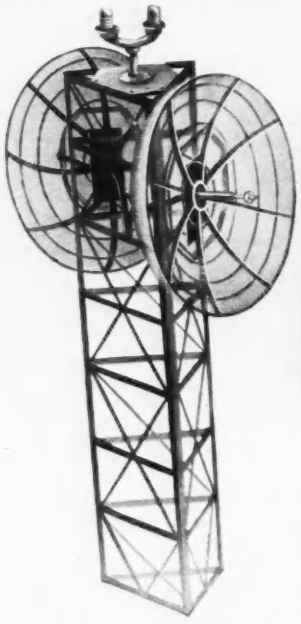
"CSP" POWER TRANSFORMERS

WESTINGHOUSE

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

BETTER FOR RADIO RELAY

-Because it's Simpler!



FOR Pipelines, Utilities, Railroads, Telephony, Aviation, Highways...

Federal PTM (PULSE TIME MODULATION) MICROWAVE

Streamlined Circuitry and Fewer Tubes Provide Greater Economy and Dependability!

SIMPLICITY . . . that's the basis for the greater efficiency, reliability and economy of maintenance of Federal Pulse Time Modulation Microwave . . . for radio relay systems of any size, type or length . . . over any terrain.

Through *simpler* equipment—requiring *fewer* tubes—Federal PTM successfully meets all needs of telephone, teleprinter, telemetering, remote and supervisory control, VHF mobile radio and other services . . . for complete, simultaneous, dependable, all-weather voice and signal facilities.

Get the facts about Federal PTM's system-wide superiority and proved performance . . . about Federal's more than 20 years of experience in microwave engineering, planning and installation. Write today to Dept. H-7103

Federal PTM Delay Line —*"Heart of the System"*

Remarkably compact and efficient . . . *has no tubes.* Maintains absolute synchronization between channels . . . provides non-shifting channel selection . . . eliminates crosstalk.

Federal PTM Pulse Generator

Supplies synchronizing pulse to delay line for simple, automatic channel synchronization, eliminating elaborate individual channel tuning provisions. Uses *fewer* tubes . . . greatly increases system dependability.

Simplest in the Field!

Federal PTM

Modulator and Demodulator

Outstanding for minimum-tube design and interchangeability. Plug-connected for ready maintenance . . . greater economy in stocking of spare parts.

HERE are some of the Federal PTM multiplex elements that demonstrate the Simplicity of Design that makes Microwave by Federal—

"Microwave at its BEST"

Federal PTM Pulse Restorer

A valuable insurance factor in longer systems. Automatically cuts in and converts repeater into temporary terminal if adjacent repeater fails . . . maintains communication over remainder of system.

MICROWAVE MOVIE: Be sure to see Federal's new 16 mm. sound-color motion picture *"Modern Communications With Microwave."* Prints shipped without charge for company or organization showings. Write to: Film Distributing Dept.

FEDERAL TELECOMMUNICATION LABORATORIES, Nutley, N. J. . . . . a unit of IT&T's world-wide research and engineering organization.

Federal Telephone and Radio Corporation

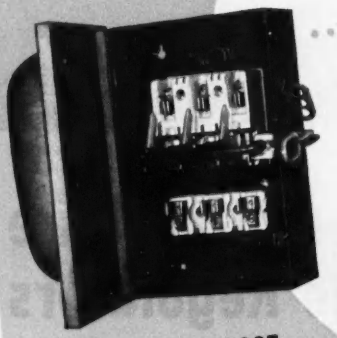
WIRE AND RADIO TRANSMISSION SYSTEMS DIVISION
100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors: International Standard Electric Corp., 67 Broad St., N.Y.

FEDERAL TELEPHONE & RADIO FTR — An IT&T Associate

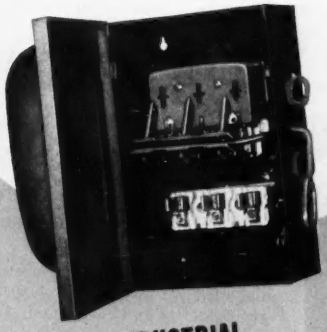
3 LINES OF SAFETY SWITCHES *for* 3 DIFFERENT MARKETS

...one line can't do two or three jobs without compromising price and performance!



GENERAL PURPOSE

• 90,000 line designed for residential, commercial and other applications where price is limiting and the service factor is not great.

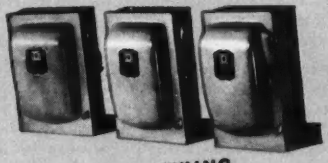


INDUSTRIAL

• 40,000 line designed for general industrial or institutional and commercial applications where the service factor is greater and price is an important consideration. MEETS BOTH GOVERNMENT AND NEMA SPECIFICATIONS FOR TYPE A SWITCHES.

HEAVY-DUTY INDUSTRIAL

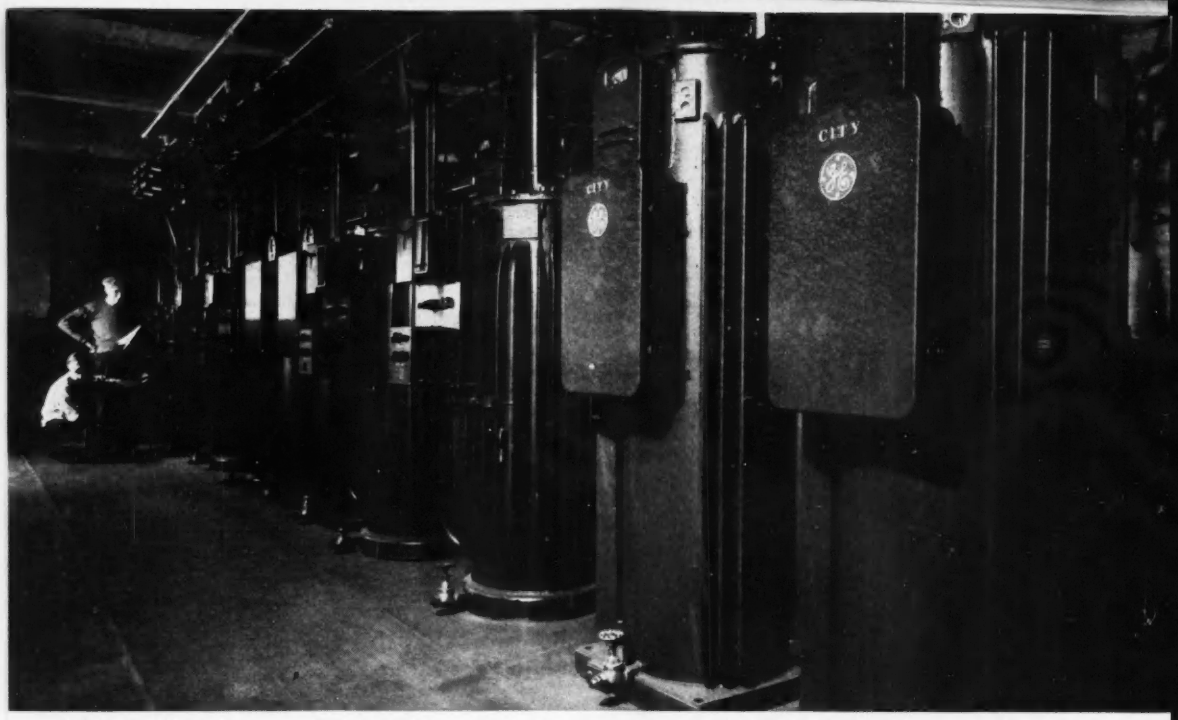
• 80,000 and 50,000 line designed for mass production industries where price is secondary to continued performance under conditions of severe service and maximum safety. The 50,000 line is used where space is limited. BOTH ARE TYPE A but go far beyond those requirements.



UNIFORM STYLING

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY



Highest quality regulation provided by 12 IRS regulators of Western Mass. Elec. Co. maintains consumer goodwill. Passing years have brought important design improvements, but even oldest units continue to provide accurate stepless regulation.

Utility Gets 21 Years of Top-notch Service From G-E Induction Voltage Regulators

Outstanding Over-all Performance. J. L. (Joe) Hyland, Supervisor of Stations, Northern Division, is thoroughly pleased with the ease of adjustment and low maintenance of IRS regulators.

Consumers get faster, closer voltage correction . . . utility reaps added benefits of reduced maintenance

J. L. (Joe) Hyland, Supervisor of Stations, Northern Division of the Western Massachusetts Electric Company, reports that the Company installed its first four G-E Type IRS single-phase induction voltage regulators at its Greenfield Substation back in 1931.

Their over-all performance and ease of adjustment so impressed company officials that they have added only G-E induction regulators at the substation since. Twelve have been installed to date—and they have been in operation almost continuously.

Protect consumer goodwill. The ability of these regulators to respond immediately to voltage changes and the resulting close regulation assure the type of service that protects valuable consumer goodwill.

They require less maintenance. Because of the rugged simplicity of the IRS design, these regulators have needed little maintenance. There are only three moving parts, which are mounted on enduring roller or ball bearings and coupled through double worm gearing. On the units built since 1940, no lubrication is necessary because the complete mechanism (including the motor) is immersed in oil.

For more information on the performance of IRS regulators, ask your G-E Apparatus Sales representative for Bulletin GEA-2985. Or write *General Electric Company, Schenectady 5, New York.* 404-94

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

FINEST DISTRIBUTION PINTYPES EVER MADE

THANKS TO VICTOR PURIFIED PORCELAIN!

There are many reasons why power men are partial to Victor Pintype insulators . . . but the biggest is that they're made of VICTOR *PURIFIED* PORCELAIN— finest insulator porcelain ever made! *PURIFIED* PORCELAIN gives these pintypes a strength and resistance to impact that are unequalled. Puncture values are higher. Uniformity, hardness, density and durability are greater than ever before!

AND, remember, every Victor Pintype is electrically tested before shipment.

***The result*—dependability under *all* service conditions!**

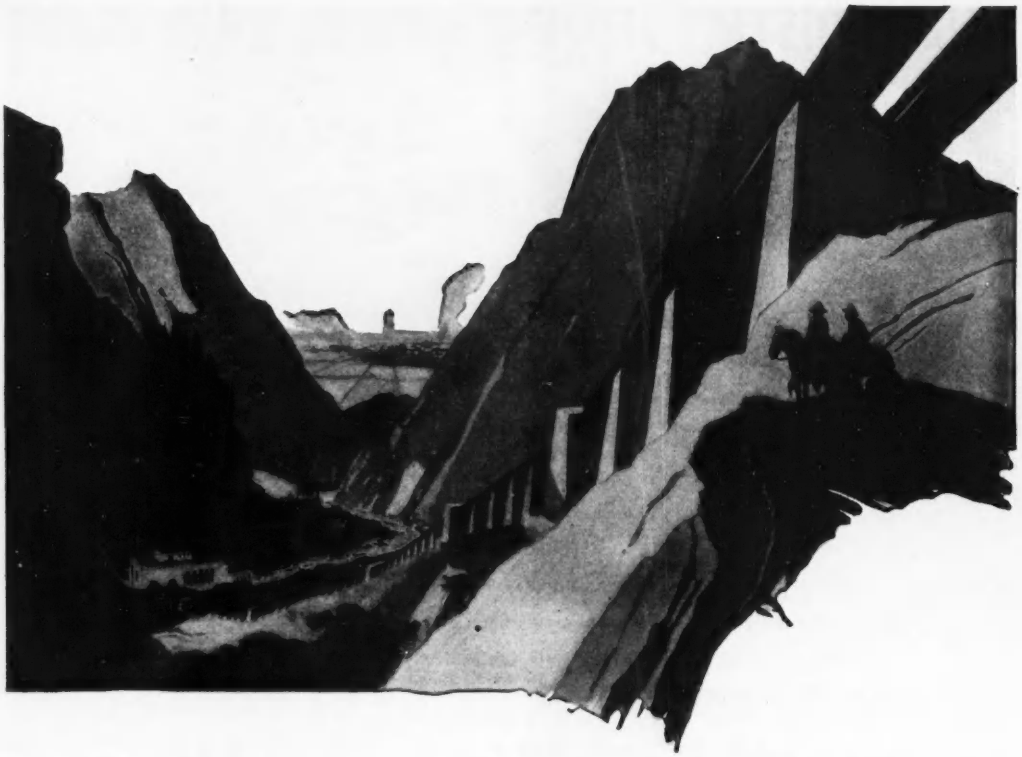
VICTOR INSULATORS, INC., VICTOR, N. Y.

VICTOR NO. 5
DISTRIBUTION PINTYPE

ADVANCE DESIGN FOR
ALUMINUM CONDUCTORS

For the larger aluminum conductors being used today, Victor has increased wire groove sizes on distribution pintypes. For complete engineering data, write today for Bulletin No. 4.

Specify
VICTOR
PINTYPE INSULATORS



SMITH Impulse Turbines

Impulse runner of *solid-cast* design, an exclusive SMITH advantage.

FOR HIGH HEADS, and wherever the head and water quantities available prohibit the use of reaction-type machines. Ideal for installations in remote localities because of the ease with which the completed unit may be transported. The simplicity of design, facility of operation and greater dependability remove the necessity of skilled operators and attendants. Smith's solid-cast runner design provides the additional advantages of closer spacing of buckets resulting in increased speed and consequently, a decrease in the size of the turbine unit, as well as the generator. Write for your copy of our Bulletin — "Impulse Turbines by SMITH!"

S. MORGAN SMITH COMPANY

YORK, PENNSYLVANIA

POWER *by* SMITH

THIRTY FEET HIGH in THIRTY SECONDS

Simple, Easy, One-Man Operation

1. Ladder hold-down on cab roof is released.

2. Pressure is applied to lower ladder rung.

3. Ladder is locked in elevated position.

4. Upper section is extended to desired height.

5. Ladder is rotated to spotting position.

6. Incline of ladder is adjusted as required.

POWERS *American* SERIES 5510

REVOLVING AERIAL LADDER

Sounds unbelievable . . . but the *Powers-American* Aerial Ladder is so simple, so fast, and so easy to operate that it can be raised to a working position in only 30 seconds—by *one man!* This versatile ladder can be spotted in 40 positions throughout a 360° revolution . . . inclined to any angle from 30 to 75 degrees. Its curved platform falls into position automatically—to provide a level working surface. What's more, this ladder is so safe that it will support *five* times the normal working load. If your operation calls for overhead work, get all the facts on *Powers-American* Aerial Ladders. Mail the coupon NOW for complete information.

POWERS *American* DIVISION

PUBLIC UTILITY BODIES AND EQUIPMENT
McCABE-POWERS AUTO BODY COMPANY
HOME OFFICE: 5900 N. Broadway, St. Louis 15, Mo.
WESTERN OFFICE: Latham Square Building, Oakland 12, Calif.

CLIP THIS COUPON AND ATTACH TO YOUR LETTERHEAD

McCABE-POWERS AUTO BODY COMPANY • 5900 N. Broadway • St. Louis 15, Mo.

Please send me details on the following:

SERIES 5510 REVOLVING AERIAL LADDER ( ) 25' 6" ( ) 26' 6" ( ) 30' 6"

- ☐ Line Construction Bodies
- ☐ General Service Bodies
- ☐ Light Duty Maintenance Bodies
- ☐ Wire Reels
- ☐ Pole Trailers
- ☐ Hydraulic Towers
- ☐ _____
- ☐ _____
- ☐ _____

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

As with every other product, there can be weakling cables and robust cables. Weakling cables are those that can be classified as having anemia of the insulation. In other words, they do not have the insulation stamina to stand up under the electrical and physical conditions to which they will be subjected. It's this kind of cable that will haunt you.

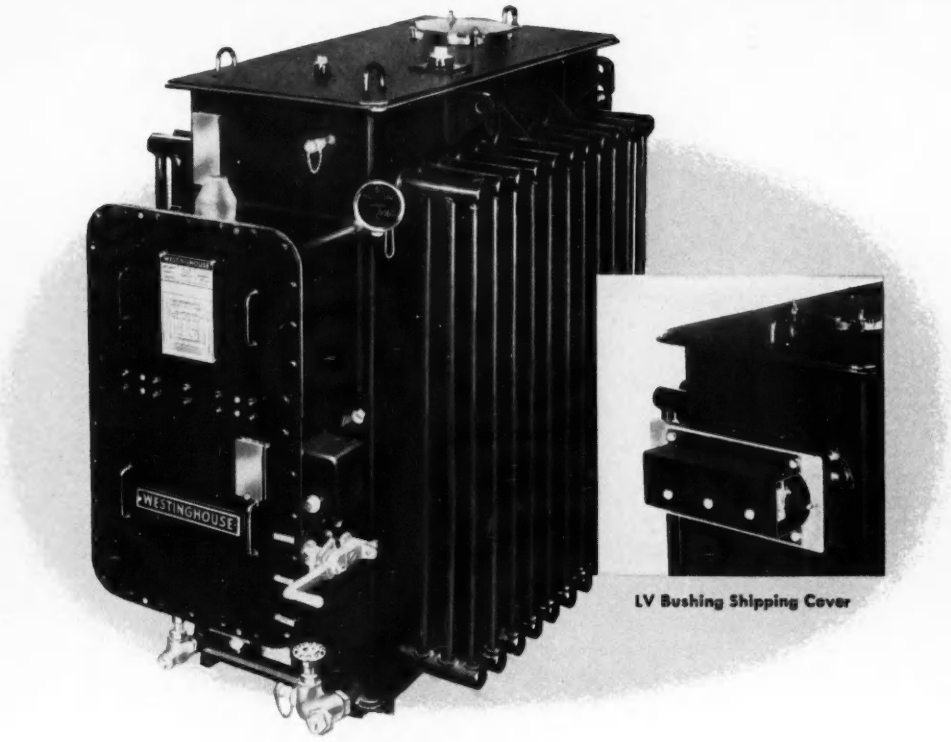
Simplex-ANHYDREX XX Cables come from a robust family. They have a guaranteed water absorption of only 15 milligrams of water when tested in accordance with U.S.C.G. specifications. They will not crack when exposed to severe ozone conditions. Simplex Anhydrex XX insulation is so robust that it will withstand these tests before or AFTER the insulation has been aged for 7 days at 250°F. (121°C.). Simplex-ANHYDREX XX Cables are recommended for operation at copper temperatures up to 176°F. (80°C.) in either wet or dry locations.

Here is an insulation that doesn't ask for special favors. It's the kind of insulation you should have on your important feeder, network, and station cables that operate in the voltage range of 2,000 to 17,000 volts. These cables won't haunt you.

Want to know more about this robust insulation? Simply send your request to the address below.

SIMPLEX-ANHYDREX XX

SIMPLEX WIRE & CABLE CO.
79 Sidney St., Cambridge 39, Mass.



LV Bushing Shipping Cover

QUALITY in the transformer ADDS RELIABILITY to the network

Everyone agrees that when you install a network system, you install *the best* for reliability and service continuity.

But the degree of reliability...or, more exactly, the freedom from maintenance, depends directly on quality in the transformers.

That's why Westinghouse Network Transformers have continuously wound coils of sliverless copper, to guard against hot spots, crystallization and pricked or scored insulation. That's why they're high-frequency tested, too.

In addition, Westinghouse Transformers are filled under vacuum, and have welded-on covers to assure a perfect seal. Finishes are not only baked for longer life, but bases are undercoated.

There are many other features such as the LV bushing shipping cover, shown above, that assure safe delivery of the quality built into Westinghouse Network Transformers. Your Westinghouse representative will be glad to give you full information, or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70646

YOU CAN BE SURE...IF IT'S

Westinghouse

NETWORK TRANSFORMERS

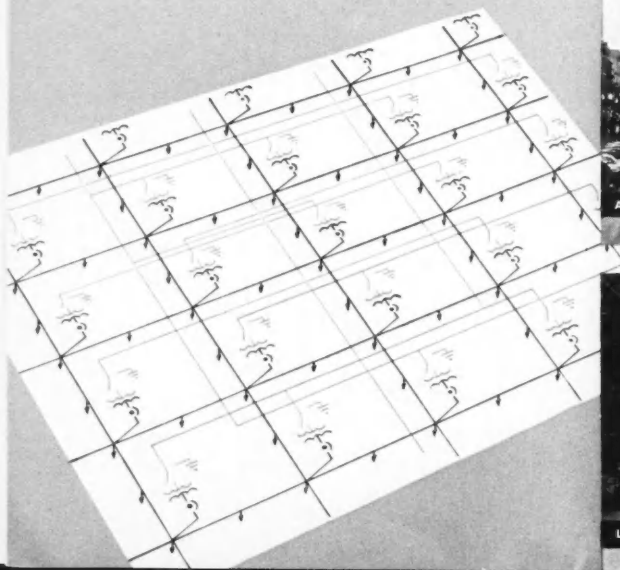
NETWORK SYSTEMS PAY... IN *NEW YORK STATE!*

BINGHAMTON converted from an overhead to an underground (radial) system in 1921. Change-over to network was accomplished between 1940 and 1945 without disrupting existing service. Load on the original network area was approximately 3,600 kva. By 1951, normal growth and some expansion of the area served had increased the network load to 6,000 kva. Further load growth, currently running 8-10%, will bring the load to 7,200 kva by 1954.

ELMIRA'S network is now in operation and the 1,300-kva load, including heavy air conditioning, is growing rapidly. A 10% increase in this load is expected by the end of 1952.

AUBURN'S network will be complete by 1953. Initial load will be approximately 2,500 kva and rate of growth is estimated at 5 or 6% per year. Serious voltage problems will be corrected by this installation.

LOCKPORT'S underground network will be complete in 1952 with a load of 1,500 kva. Congestion of overhead system and lack of room for expansion dictated an underground network.



BINGHAMTON, NEW YORK

ELMIRA, NEW YORK

AUBURN, NEW YORK

LOCKPORT, NEW YORK

4 more cases where networks met growth problems

New York State Electric & Gas Corporation serves an area embracing about 35% of New York state, covering 16,700 square miles in 43 counties. This is the home of some 1,400,000 people, and a widely diversified group of industries. To keep ahead of the actual electrical needs of this rapidly growing area requires constant and careful planning.

NETWORK PLANNING STARTED IN 1939 . . . this utility was faced with numerous interruptions caused by cable burn-offs, and unbalanced voltage and current conditions in the secondary distribution system. To correct these conditions, and at the same time prepare for sizable load growth, the A-C Secondary Network offered the most flexible, economical, long-range solution.

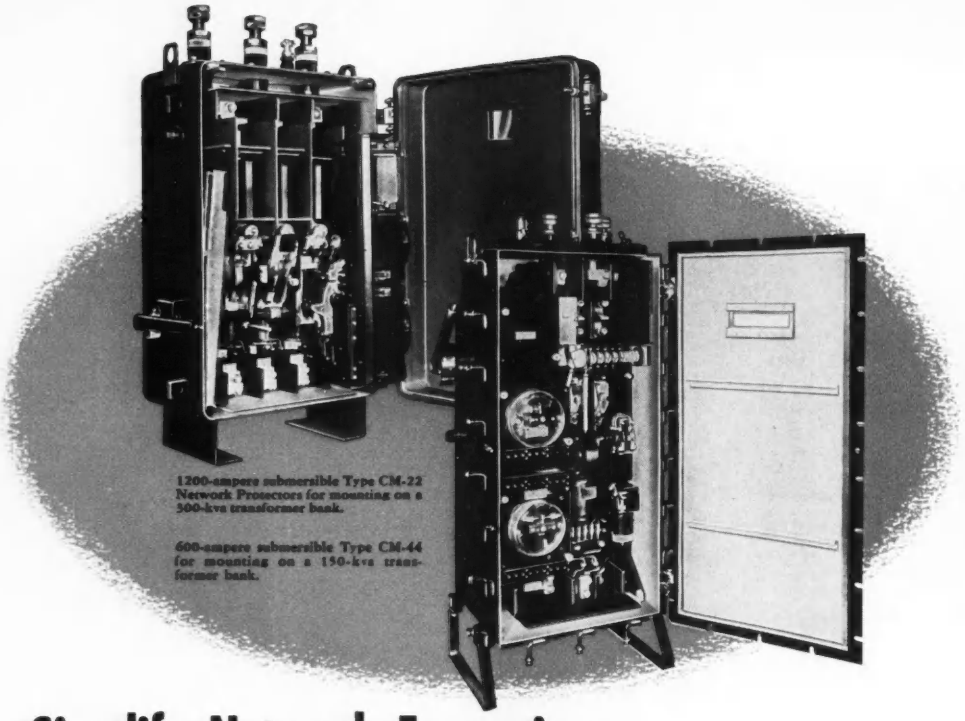
TODAY, New York State Electric & Gas Corporation measures the effectiveness of its A-C Secondary Network installations in ability to handle greatly increased load with improved reliability and quality of service. At the same time, the networks have eliminated duplicate services, separate substations previously required, and have materially reduced maintenance expense. They enjoy interchangeability of uniform equipment, too. Since the first network installation in Binghamton, others have been added in Elmira, Auburn, Lockport; and still other cities in the system are now being considered for network service.

THE RANGE OF WESTINGHOUSE NETWORK EQUIPMENT enables you to employ the type of system best suited to your local problems. Booklet B-4002 contains complete information about the flexibility and advantages of the A-C Secondary Network System. Our system planning facilities are at your service. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-97166

YOU CAN BE SURE...IF IT'S

Westinghouse

NETWORK EQUIPMENT



1200-ampere submersible Type CM-22 Network Protectors for mounting on a 500-kva transformer bank.

600-ampere submersible Type CM-44 for mounting on a 150-kva transformer bank.

Simplify Network Expansion with Westinghouse NETWORK PROTECTORS

You can expand your network system simply—and economically—with Westinghouse Network Protectors. The reason—Westinghouse heavy-duty and medium-duty protector use the same relays. Hence, as load grows medium-duty (CM-44) protectors can be replaced with heavy-duty (CM-22) protectors and suitable transformers—*without upsetting system co-ordination!* CM-44 units may then be moved to lighter load areas.

Keep this important Westinghouse feature in mind as YOU plan your network system. It's a *sure* way to provide for simple, low-cost expansion of that system when load conditions dictate.

Ask your Westinghouse representative for further information . . . or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. J-60778

ONLY WESTINGHOUSE NETWORK RELAYS . . .

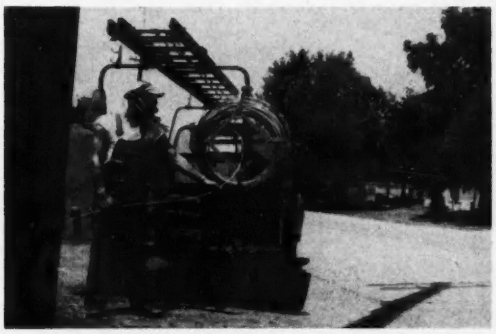
- Eliminate gears that cause friction and wear.
- Have a sensitive reverse-current setting that can be varied from .1% to 10% of the network protector rating.
- Have bearing surfaces readily accessible for inspection and cleaning.
- Have relay terminal screws that eliminate the need for additional testing facilities in the control wiring.
- Provide a nonsensitive relay that permits sensitive tripping after a time-delay.

YOU CAN BE SURE . . . IF IT'S

Westinghouse

NETWORK PROTECTORS

PRODUCT NEWS



Guy Wire Dispenser

(1) A. B. Chance Co., Centralia, Mo.

This guy wire dispenser is claimed to add speed and safety to guying jobs by feeding the wire smoothly while eliminating the whipping of strand ends. Guy wire is fed from the center of the coil through the dispensers square opening, which prevents uncoiling of the strand.

Wire can be unreeled from a vertical or horizontal position, so that the dispenser may be hung from a truck by the ring holder or placed flat on the ground. After use, the assembly may be placed in the truck to prevent bending the unused guy strand. It weighs 21 lb without the guy coil.

The dispenser is loaded by removing a wing nut and spreading two bars at the top to insert the coil. After the bars are replaced and the wing nut tightened, the binding wires can be cut from the coil.

Radio Communications Equipment

(2) Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.

Designed for those qualifying in the Citizens' Radio Service band, a new line of radio communications equipment operating in the 450-470-mc band includes mobile units for 6- or 12-v d-c operation. Associated base station models are available with local or remote control facilities.

The new receiver design features include sealed silver-plated cavities for optimum RF signal preselection characteristics, triple conversion in conjunction with the Permakay filter, automatic frequency control and a stand-by drain-saver circuit.

The transmitter uses nine tubes. Nominal output power is 20 w.

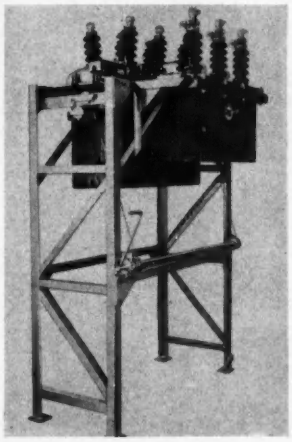
Cement

(3) Singer Home Products, 121-03 Sutphin Blvd., Jamaica 4, N. Y.

A clear liquid claimed to insulate and waterproof instantly, to stop leaks and to cement materials to each other is being offered under the name Weldit. It is said to be unaffected by water, alcohol, naphtha, oil, gas. It does not get hard or brittle, according to the manufacturer, and when dry is a nonconductor.

Heavy-Duty, 3-Phase Recloser

(4) Line Material Co. (a McGraw Electric Co. Division), Milwaukee 1, Wis.



Designed for use on distribution lines where high fault currents may be encountered, this new heavy-duty, 3-phase, oil circuit recloser, type R, is claimed to give an accurate means of protection against system outages from faulted feeder circuits and, through simultaneous 3-phase tripping, to prevent possibility of feed back through 3-phase loads.

Type R is available in nominal load ratings from 25 to 280 amp and has a maximum interrupting rating of 6,000 amp on systems up to 4.8 kv and 4,000 amp on systems up to 14.4 kv. These ratings are obtained by using the oil cross-blast principle, essentially as in the Kyle type L recloser.

It may be pole or station mounted. The mounting frame for substation use has a tank lifter to facilitate inspection of the unit out of oil without demounting. This frame has a connector for grounding the frame and all other electrically grounded parts. A frame for pole mounting is available also.

To extend the zone of protection to cover high impedance ground faults, the recloser is available with a ground trip solenoid, which may be energized with a Kyle type TR current transformer or other relaying system.

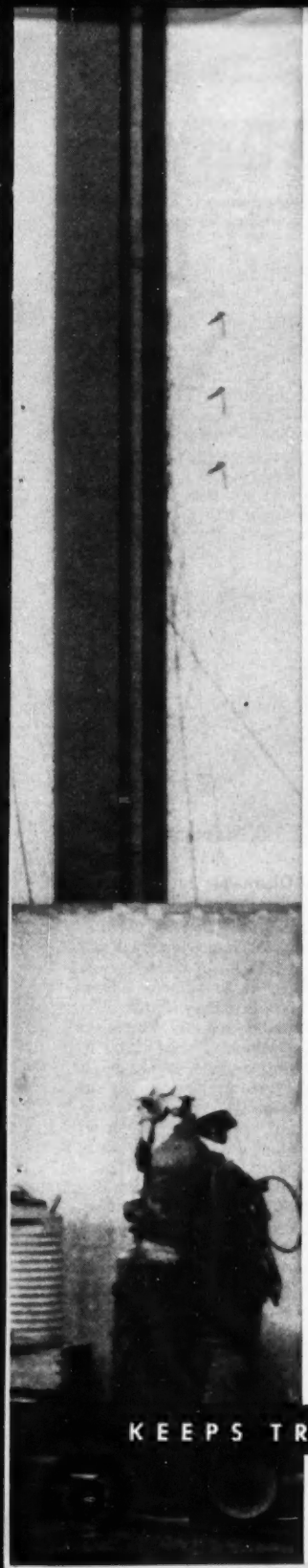
In operation the unit is completely automatic and self-contained. All opening and closing operations are simultaneous for all three phases. According to the manufacturer, this is a new feature in application of heavy-duty, 3-phase reclosers and is very desirable for the range of ratings of the type R, since it prevents possibility of feed back from 3-phase loads and insures maximum protection against single-phasing.

This recloser is designed to coordinate with other types of Kyle sectionalizing equipment and with branch line fuses. It is claimed to be a rugged, dependable unit, capable of replacing breakers in substations up to 100,000 kva interrupting capacity at less than half the cost of the breakers.

It is shown here with TR current transformer in substation mounting frame.

One of seven single phase corona-free transformers of Southern California Edison Company's substations. Each unit is rated 30,000 kva, 127.1/220 kv — 72 kv with load ratio control in the low voltage winding.

CORONA-FREE DESIGN



PRESCRIPTION for LONG TRANSFORMER LIFE:

CORONA *free* DESIGN

INSULATION THAT COULD LAST for years deteriorates under the impact of corona. By charring insulation and making it conductive, corona progressively steals life from your transformer.

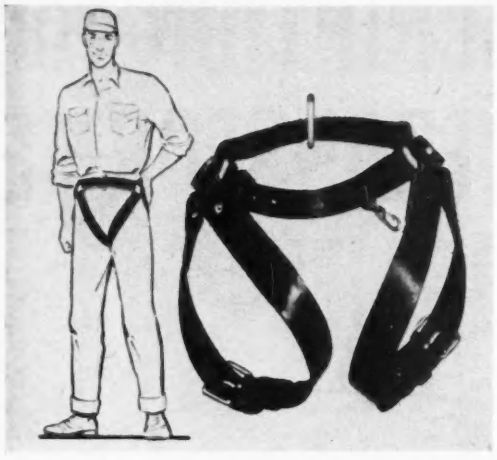
WHAT ABOUT CORONA-FREE DESIGN?

Corona-free design prevents corona from forming even at the highest test voltages. Your transformer keeps full insulation strength in windings, tap changers, terminal boards and other parts because they are kept free from corona's injurious effects.

Allis-Chalmers corona-free design removes an obstacle to long transformer life. For the years ahead it provides the strength and performance you originally specified. It keeps your transformers young. Allis-Chalmers, Milwaukee 1, Wisconsin. A-3799

ALLIS-CHALMERS

KEEPS TRANSFORMERS YOUNG



Nylon Harness

(5) Mathias Klein & Sons, 3200 Belmont Ave., Chicago 18, Ill.

A nylon harness for tree service is lighter than a leather one and is claimed to be especially comfortable because the weight of the wearer is distributed along the leg straps as well as the body strap. The safety line is attached to a floating Dee ring at the front. The harness is made of multiple-ply nylon bonded in neoprene and is tested to sustain 250 lb on a 5-ft drop. According to the manufacturer, it is smooth, flexible, wears evenly and does not require dressing or treatment. It has drop forged tested hardware with solid copper rivets and comes equipped with a harness snap. It is adjustable from 36 to 44 in.; is listed as No. 5210 tree trimmer's harness.

Interlocking Device

(6) Rodale Mfg. Co. Inc., Emmaus, Pa.

A 10-amp midget cap and cord connector body features a heavy wall Bakelite body and newly designed cord clamp accommodating a greater range of cord sizes. The connector body, which is polarized, comes with a metal cord clamp coated to resist rust and corrosion (No. 2210) or without cord clamp (No. 2212). Caps, available with polarized blades, come with metal cord clamp (No. 2211) or without cord clamp (No. 2213).

The device is rated 10 amp, 250 v and 15 amp, 125 v. Cord hole diameter is 0.140 to 0.500; outside diameter, 1 in. It is interlocking and interchangeable with other makes.

Tapes

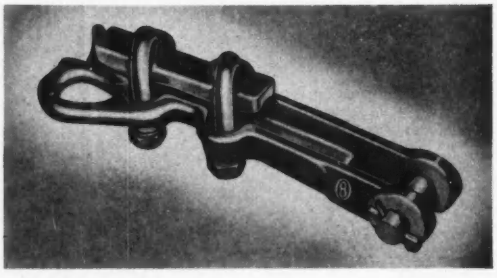
(7) Ideal Industries Inc., 1042 Park Ave., Sycamore, Ill.

A new line of electrical tapes includes a four-coated, ravel-free friction tape, a quick-fusing high-dielectric rubber tape, a two-in-one plastic tape. The plastic tape gives insulation and protection against weather and mechanical abuse. The vinyl plastic body has a dielectric strength of more than 8,000 v and is highly resistant to acids, alkalies, corrosive salts, water, oils, greases and alcohols, it is stated. The minimum thickness (.007) and two-way stretch of this plastic tape makes it fit snugly to irregular shapes and surfaces, according to the manufacturer. Details in bulletin P-1.

Labeling Tape

(8) Labelon Tape Co. Inc., 450 Atlantic Ave., Rochester 9, N. Y.

A pressure-sensitive marking tape that can be written on with a pencil or any pointed instrument has been developed for circuit identification and other labeling. The writing appears beneath a transparent plastic outer layer that protects it against smudging, dust, dirt, oil, water and chemicals. Temperatures between –40 F and 160 F do not affect the tape, which will not fade and can be stripped off one surface and reapplied to another. Four standard colors are available in widths from 5/16 in. to 2 in. in a variety of roll lengths.



Deadend Clamp for Large-Diameter Feeders

(9) Ohio Brass Co., Mansfield, Ohio

A line of five Strateline deadending clamps that will accommodate cables from 0.15 to 1.55 in. in diameter was designed to simplify deadending of large-diameter aluminum conductors in primary and secondary distribution and in station buses. The four smaller sizes are for use on distribution lines where tensions seldom exceed 2,000 lb per phase and where surplus clamp strength is considered less desirable than small bulk, greater convenience in handling and lower cost. The largest clamp, with a slip strength of 8,000 lb, was designed principally for station bus support, and has limited radial dimensions for locations in which clearance is restricted.

These clamps come in malleable iron, bronze or aluminum (with liners for malleable iron clamps on request) and clamp and conductor metals can be matched to minimize electrolytic attack. They have slip strength safety factors of three or more on low-tension applications and can be worked hot with hot sticks or by hand, it is stated.

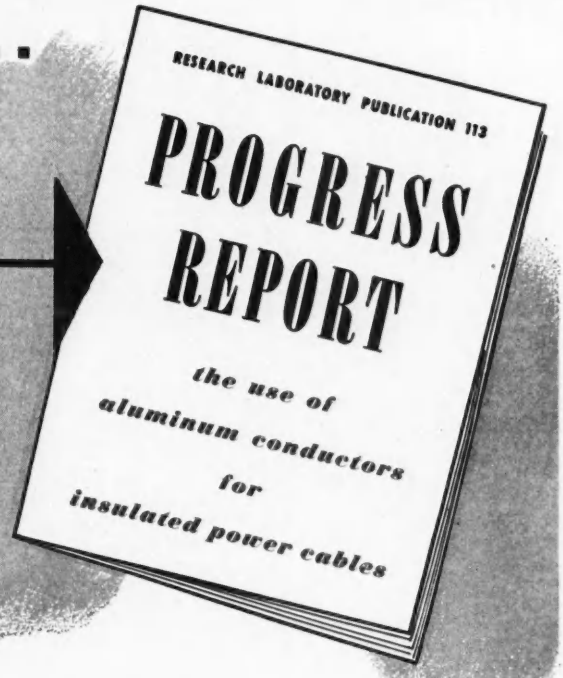
Wire Connectors

(10) Van Cleef Bros. Inc., 7800 Woodlawn Ave., Chicago 19, Ill.

Wire connectors have been added to this manufacturer's line and are available in four standard sizes—DB-6, -4, -3 and -1. They are UL listed; are made of finest grade phenolic material, the manufacturer states.

IF YOU USE ELECTRICAL WIRES AND CABLES...

look into the possibilities of using aluminum conductors



This report includes information on: economies with aluminum, variety of designs available, wide scope of applications, analysis of operating records, and installation techniques.

The low cost and light weight of aluminum give it certain natural advantages for many types of insulated power cables. For example, you should consider cables with aluminum conductors for aerial and overhead circuits, or burial directly in the ground. Some plants have advantageously installed aluminum cables in conduit systems.

Section of pioneer 15kv paper insulated power cable with aluminum conductors. Manufactured by Okonite-Callender for a large New England utility and installed in spring of 1952.

Okonite has an extensive experience with aluminum. Hundreds of thousands of feet of Okonite cable with aluminum conductors are establishing excellent operating records with many of our customers. Accelerated emphasis during the last five years in our long-range development and testing program, has provided us with the widest background in the application of insulated aluminum cables.

You can get the complete story, including technical information, from Research Publication WE-113. Get it now, for a practical answer to important cable problems. Just fill out the coupon and mail it to the address below; a free copy of this Research Publication will be sent you promptly by return mail. The Okonite Company, Passaic, N. J.

THE BEST CABLE IS YOUR BEST POLICY

OKONITE

SINCE 1878

...insulated wires and cables

PRODUCT DEVELOPMENT DEPT.
The Okonite Company, Passaic, N. J.

Please send me Research Publication WE-113.

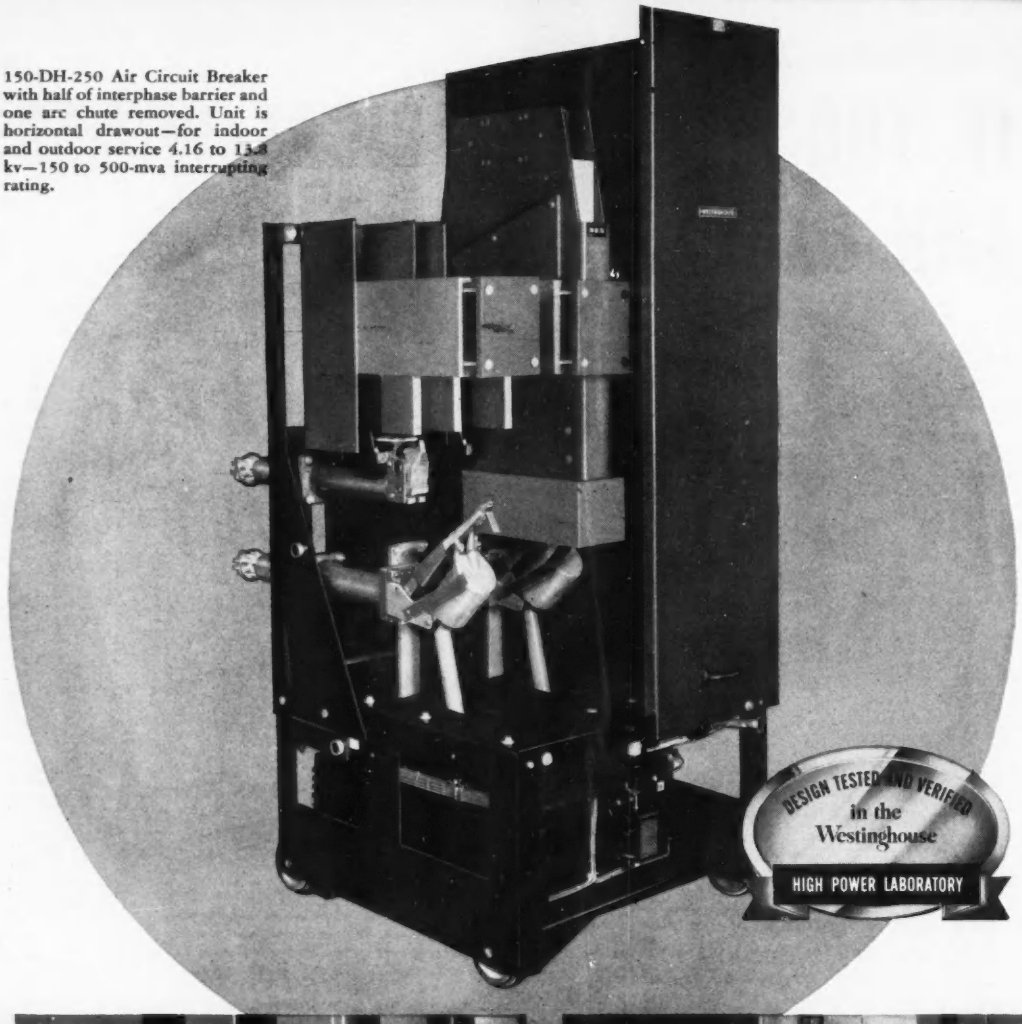
Name.....

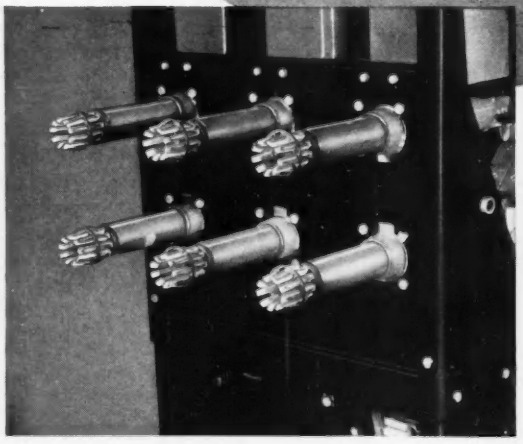
Company.....

Street.....

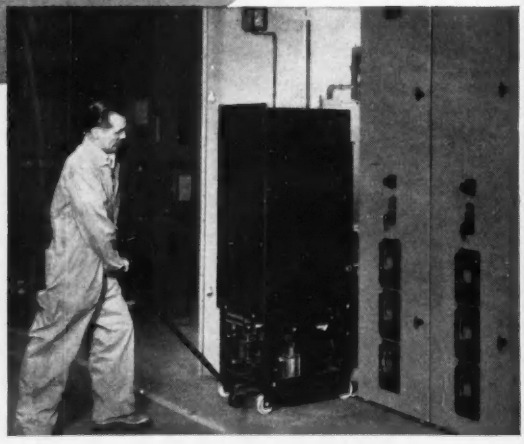
City.....State.....

150-DH-250 Air Circuit Breaker with half of interphase barrier and one arc chute removed. Unit is horizontal drawout—for indoor and outdoor service 4.16 to 13.8 kv—150 to 500-mva interrupting rating.





Positive contact is obtained on primary disconnects by individual flat springs and heavily silvered, self-aligning, finger-like segments. Segments on breaker are easy to inspect.



Horizontal-drawout feature makes it easy to place breaker into operation. Two-surface wheels which ride on track in stationary structure assure perfect alignment for engaging contacts.

The DH De-ion® breaker design pays performance benefits

IN EVERY PHASE OF METAL-CLAD SWITCHGEAR OPERATION!

Here's how the Westinghouse DH Air Circuit Breaker for Metal-Clad Switchgear gives you the kind of performance you want . . .

Fast, positive, arc interruption . . . DH Air Circuit Breakers employ the De-ion® principle of arc interruption—the most efficient method of arc extinction in use today. The De-ion principle is a Westinghouse exclusive! The true ceramic material used in constructing the arc chutes provides unusually high resistance to heat shock.

Simple, effortless operation . . . DH Breakers are the horizontal-drawout type. No lowering or lifting is necessary. There's no complicated mechanism to require frequent inspection or maintenance. Breakers are drawn straight out from disconnected position . . . require only a few easy turns of a crank to move into operating position.

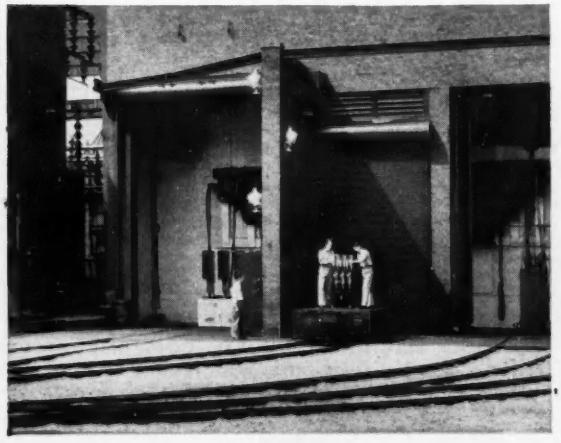
Easy inspection and maintenance . . . Breaker interphase barriers can be removed by simply loosening holding bolts. Arc chute removal—just as simple—exposes contacts at an accessible and convenient working height for quick inspection and maintenance. High-pressure, finger segments located on breaker primary disconnects further simplify maintenance.

"Long-life" construction . . . All breaker elements are secured to a rigid, all-welded steel frame. Hardened, stainless steel is used at major wearing points . . . silver-tungsten arcing contacts have high resistance to arc burning.

Perfect alignment for interchangeability . . . The use of a master breaker and a master stationary structure in manufacturing holds drawout units and stationary structures to close dimensional tolerances. Result is perfect alignment . . . easy interchangeability.

Proved operation . . . The DH Air Circuit Breaker design has been extensively tested in the Westinghouse High Power Laboratory. The results of these tests are verified by many years of satisfactory field performance on thousands of breakers.

For complete information on Westinghouse Metal-Clad Switchgear write for Booklet B-5306. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60795



A DH Air Circuit Breaker is brought into a test cell in the Westinghouse High Power Laboratory to verify a new design feature under short-circuit conditions.

See "Electrical Proving Ground"

. . . the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details see your Westinghouse representative, or write: Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania.

ELECTRICAL PROVING GROUND

YOU CAN BE SURE . . . IF IT'S

Westinghouse

METAL-CLAD SWITCHGEAR

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

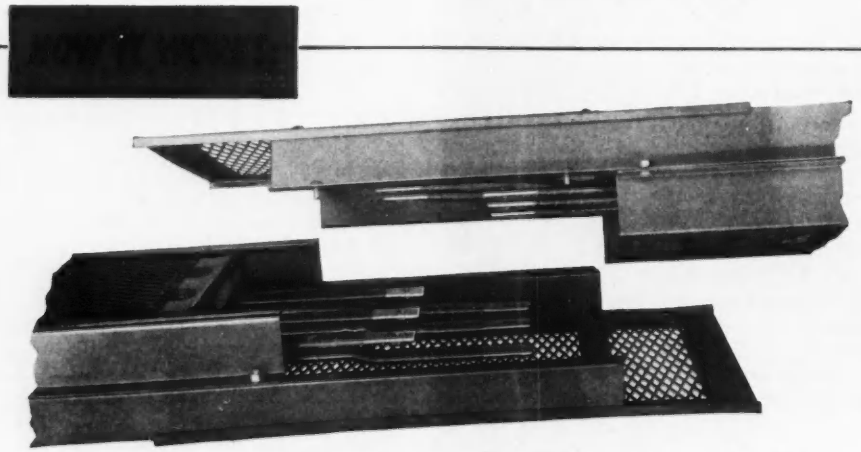
LO-X Duct's scarf-lap joint slashes installation costs

Before you select a bus duct system, be sure to check carefully into installation costs. For it is here, *with BullDog LO-X BUStribution Duct,* that you can make important savings in man-hours, money and materials.

Here's why: BullDog's *exclusive, patented* scarf-lap joint, described below, greatly simplifies installation. Makes LO-X Duct easier, faster to install; gives you a stronger, more rigid system. You save *substantially* on initial installation, and again whenever your plant layout is shifted.

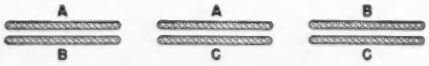
When considered along with other famous BullDog features, low voltage drop and low operating temperature, this reduction means BullDog LO-X Duct will bring you *rock-bottom* current-carrying costs per ampere per foot.

Why not call in a BullDog Field Engineer or your nearby BullDog supplier for *all* the facts? LO-X Duct is used for feeder and welder circuits, carries up to 4000 amperes at 600 volts or less. Ask, too, about BullDog Plug-In Duct for branch circuits. Free literature available by writing direct.



SCARF-LAP JOINT—One half of each LO-X casing extends 14" beyond other half; overlaps adjoining casing end to form a highly rigid scarf-lap joint. Casings lap together simply, quickly . . . save countless installation hours. No splice plates, bulky joint covers, or complicated construction to slow down the job and increase costs. No poor bus bar connections, either.

Bus bars overlap also, are bolted with splined steel inserts and special spring cup washers. Joint stays tight, whatever the current or temperature variations.



End view showing staggered-phase arrangement of bus bars in LO-X Duct.

PAIRED PHASING—Another LO-X *plus!* Bus bars are closely spaced inside ventilated casing and arranged in paired phases that neutralize magnetic fields, assure uniform current distribution all along bus bar. Current flows more evenly, voltage drop and temperature rise are reduced.

BULLDOG

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO
PIONEERS IN FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS

1902 TO 1952 . . . SERVING INDUSTRY FOR 50 YEARS WITH FINER ELECTRICAL PRODUCTS

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

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1720 N. E. Sixth Avenue—Tel. TUxedo 5191
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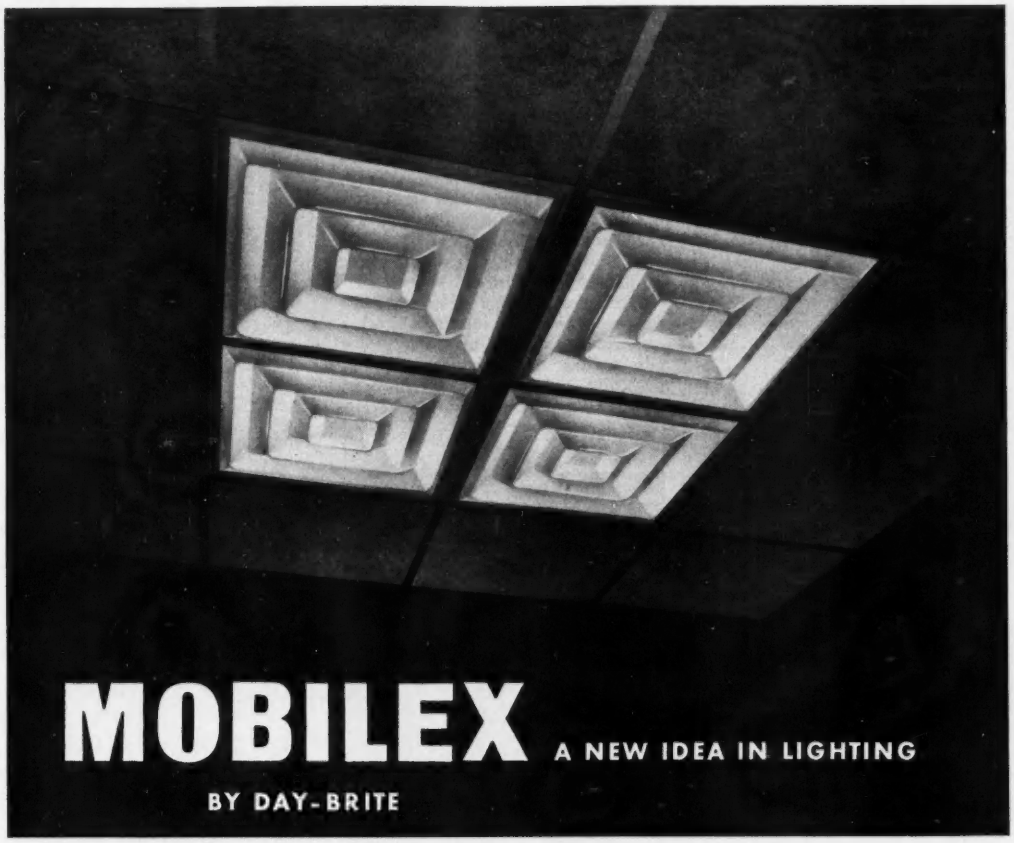
Paul L. Mullenbach Co.
3008 E. Olympic Blvd.—Tel. ANgelus 9-8101
Los Angeles 23, California

Young Electric & Manufacturing Co.
2134 Curtis Street
Denver 2, Colorado



MOBILEX A NEW IDEA IN LIGHTING

BY DAY-BRITE

MOBILEX introduces a new, flexible recessed lighting system designed for use as an integral part of the newly developed grid-type suspended ceiling which consists of interlocking "tees" supporting Fiberglas* Ceiling Boards.

MOBILEX is available in 2′ x 2′ units for two, three or four 20-watt fluorescent lamps and in 2′ x 4′ units for two, three or four 40-watt fluorescent lamps. RAPID-SMOOTH START ballasts are standard on all 40-watt units.

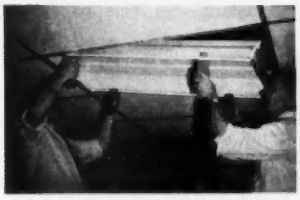
Three shielding elements provide a variety of pleasing patterns. Moulded plastic (illustrated above), Skytex glass, and Boxco (R) louvered frames are interchangeable and hinge from either side for easy servicing.

MOBILEX is extremely flexible. Units may be used singly, end to end, or side by side . . . and in any combination. A wealth of interesting patterns is possible.

Installation is simple. Compress the sides of the fixture to clear ceiling rails. Insert the fixture into the grid opening and let it rest on the rails. End baffles lock the compression feature in place. Make electrical connections, add hinged shielding frame and installation is complete.

MOBILEX is new, practical and competitively priced. Here's a perfect answer for those tough remodeling jobs and new projects with a limited budget. Get the full MOBILEX story. Write for Bulletin OD-567—today.

Fiberglas is the trade mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corp., Toledo, Ohio



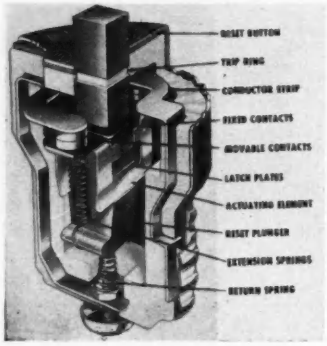
ABOVE: Easy to install. Simply compress the sides of the fixture and insert it into the grid opening.

BELOW: No hangers or suspension straps. Fixture rests on grid rails. Fixtures can be added or changed at any time.

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

279

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Missouri
In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario



Miniature Circuit Breaker Installed Like Fuse

(11) Mechanical Products Inc., 1824 River St., Jackson, Mich.

The Mini-Breaker is a miniature branch circuit breaker that can be installed like a fuse in any standard Edison base fuseholder delivering 110-125 v a-c. According to the manufacturer, it requires no additional equipment and no rewiring when applied as a direct replacement on existing fuse-protected circuits of corresponding 15-, 20- and 30-amp ratings.

Although it resembles a fuse, it is actually a rugged thermally actuated circuit breaker consisting of 25 precision-built parts self-enclosed within a special insulating case, the manufacturer states. Designed primarily for residential, commercial and industrial service, it is said to meet and exceed the temperature extreme conditions for aircraft use.

It safely interrupts excessive overloads and short circuits, tripping instantly on shorts, but has a built-in time lag to handle temporary starting loads and line surges. While service can normally be restored within 10 seconds by pressing the reset button, the device is 100% trip-free and will not maintain a circuit that has not been cleared, the manufacturer claims.

Mini-Breaker has been submitted to Underwriters' Laboratories and is said to pass all tests required for listing as a "Circuit Breaker—Miscellaneous." It is now in limited initial production in 15-, 20- and 30-amp ratings. When commercially available it will be UL listed and will bear the UL Re-examination Service marker, according to the manufacturer.

(12) RECORD BRUSH—A phonograph record brush that attaches to the tone arm and sweeps the record clean as it plays is offered by Permo-Fidelitone, 6415 Ravenswood Ave., Chicago 26, Ill. Mystik Adhesive Products furnishes the tape that attaches the brush to the tone arm.

Panelboard System

(13) Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

A new system utilizing the Stab-lok circuit breaker makes it possible to arrange on-the-spot panelboard assemblies. According to the manufacturer, an entire panelboard may be assembled in minutes with the correct size enclosure and required number of 1- and 2-pole Stab-lok circuit breakers, available from distributor's stock.

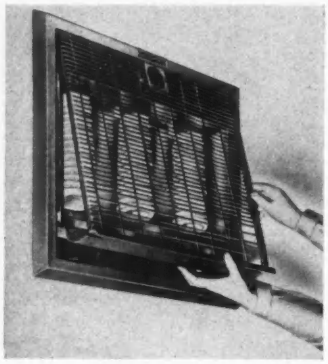
Enclosures contain 4½-in. gutters for easy wiring; the interior is quickly removable to give accessibility for wire pulling; the trim lines up automatically. Polarity sequence provides for most requirements up to 42 circuits, it is stated.

Crimping Tool

(14) F. M. Anthony Co., 2022 Oakland Ave., Piedmont 11, Ill.

Feature of the new Insul-Lock line of connectors, terminal lugs, insulating sleeves and tools is a mechanical-type portable hand crimping device that makes a full circumferential crimp and will crimp a range of wire and cable sizes from No. 4 through No. 500 MCM without changing dies or application of heat. The tool weighs 2¾ lb, is claimed to be inexpensive, to require practically no maintenance and to be simple to operate. It works in a ratchet principle and rolls a crimp into the connector and lugs.

Also in the line are bench tools for use in the shop, cable adaptors and other special fittings. For welding cable, the manufacturer has, in addition to connectors and lugs, premolded rubber and neoprene insulating sleeves that can be put over splicing connectors with a special mounting tool.



Electric Room Heaters

(15) Cavalier Corp., Chattanooga 2, Tenn.

Tapered cone construction (patent applied for) is claimed to circulate ⅓ more heated air up through the element than is generally circulated by gravity-type heaters. The tapered cone is a specially designed Cordierite ceramic and is said to have exceptional strength and resistance to heat shock. It cannot rust, corrode or deteriorate with time, according to the manufacturer. The heating element is high-grade nickel-chrome resistance wire.

The heater has no fan and is completely automatic. It can be cleaned in three minutes, the manufacturer states. It is available in wall insert, surface-mounted, heavy-duty portable and bathroom models. Each type comes in various sizes.

Fire Protection for Uprights

(16) The Zone Co., 917 N. Main St., Fort Worth 6, Tex.

A company which has been making a fire-retardant coating for horizontal surfaces has recently introduced Fireplate for wood uprights. Made up of fire-retardant chemicals combined with bituminous materials and a jelling agent, this coating is claimed to "stay put" on vertical wood surfaces under extreme heat and to release fire-smothering gases. It is said to provide fire protection the moment it is applied because of an incombustible solvent in the formula. This product is packaged in 30- and 55-gal drums and in 5-gal pails.

(17) FLOW METERS—Superseding the model 40M, a new line of series 500 open-channel flow meters for measuring, recording and controlling the flow of water, sewage, industrial plant effluent, irrigation water and other liquids is offered by the Bristol Co., Waterbury 20, Conn. A mechanical and an electric type are available.

AIR COOLING Cuts Cleaning Costs ...Boosts Lamp Life...

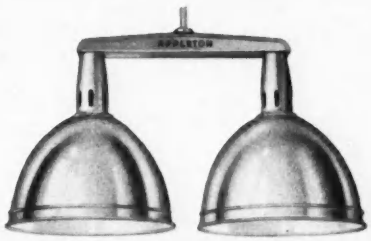
APPLETON VENTED INDUSTRIAL LIGHTING

Now APPLETON Industrial Lighting for high bay interiors is available with a new cooling feature that cuts deeply into your lighting costs.

Air vents in the necks of these durable fixtures permit air to circulate freely through the full depth of the reflector and along the neck of the lamp. Dirt and dust keep on moving upward through the vents. Deposits on reflecting surfaces and lamps are minimized. Operating temperatures are held at lower levels. Result: Greater lighting efficiency, longer lamp life and lower cleaning costs.

APPLETON Vented Industrial Lighting Fixtures are available with either porcelain enamel or Alzac Aluminum finish, single or twin mounting, and for use with either mercury vapor or incandescent lamps.

For lighting fixtures that meet every industrial requirement—including hazardous locations—specify APPLETON, The Standard For Better Lighting.



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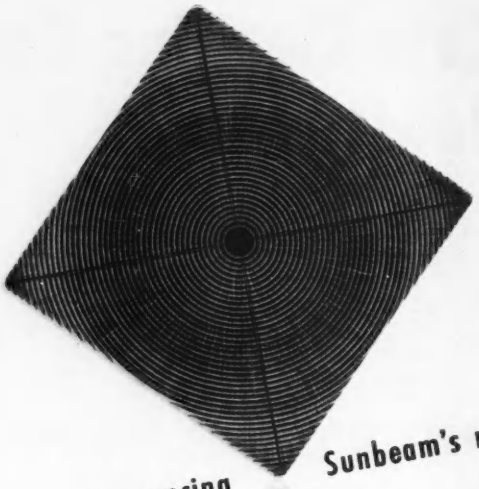
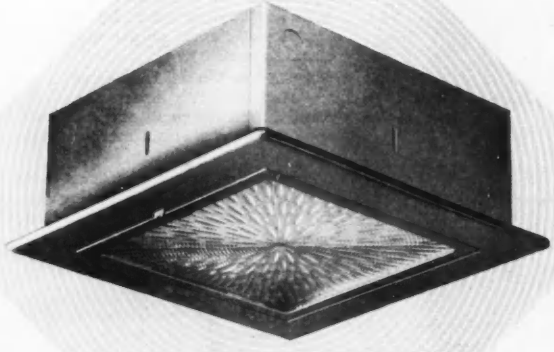
Export Representatives: International Standard Electric Corp., 67 Broad St., New York 4, N. Y.

APPLETON ELECTRIC PRODUCTS



Announcing **Sunbeam's new recessed incandescent line**



50100 SERIES

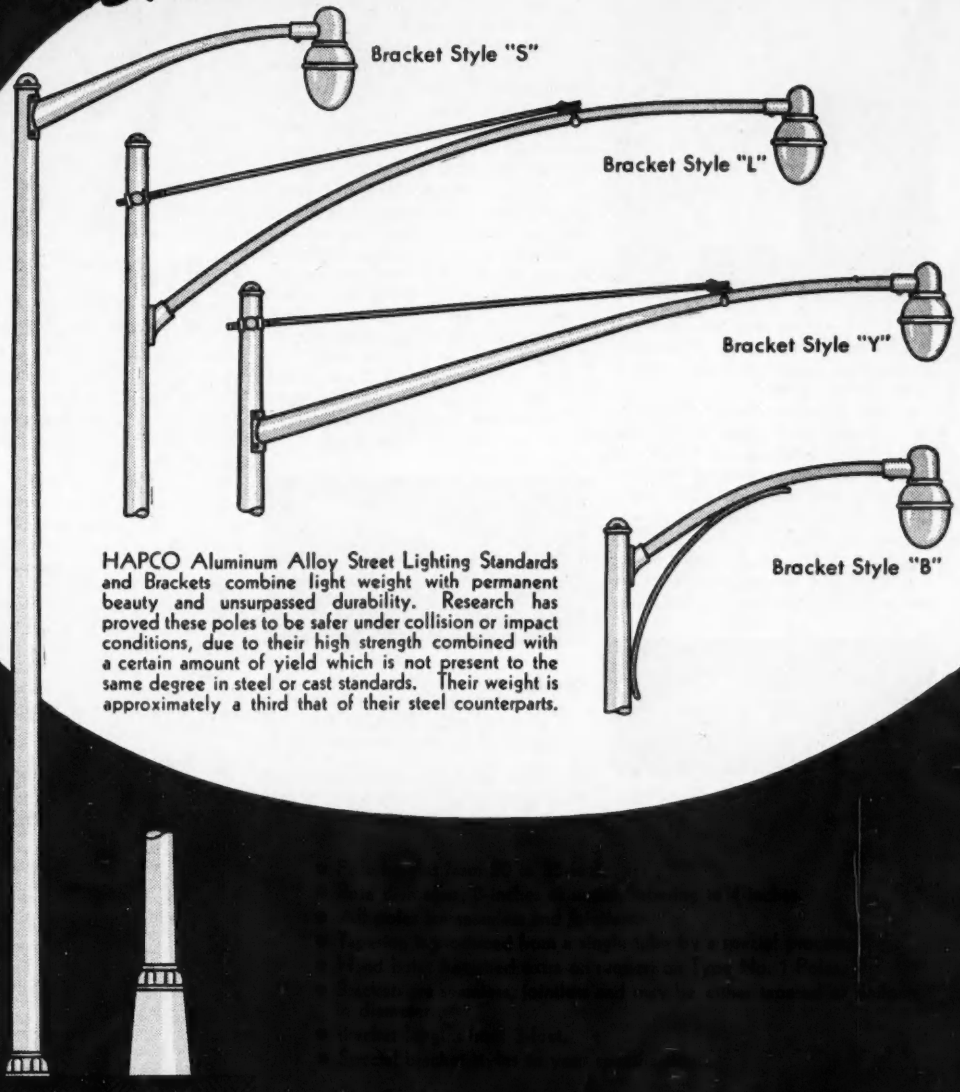
Constantly expanding to provide greater service to lighting, Sunbeam now offers a new line of incandescent fixtures. The same high quality workmanship and application of photometric engineering which marks our fluorescent line is extended to the incandescents. Various designs and sizes available to fulfill prescribed illumination requirements with added features for installation and maintenance ease. A typical unit is the 50100 series, a shallow recessed box (10⅛" square, 4⅝" deep) having a 8½"Holophane Controlens* and polished aluminum reflector. Speedy access to lamp achieved by "finger control" latch and drop-type hinge for bottom panel. Inquire, today, for further info.

Sunbeam Lighting Company, 777 East 14th Place, Los Angeles 21, California

*®Holophane Company, Inc.

HAPCO Aluminum Alloy Street Lighting Standards

...STING BEAUTY



HAPCO Aluminum Alloy Street Lighting Standards and Brackets combine light weight with permanent beauty and unsurpassed durability. Research has proved these poles to be safer under collision or impact conditions, due to their high strength combined with a certain amount of yield which is not present to the same degree in steel or cast standards. Their weight is approximately a third that of their steel counterparts.

HUBBARD ALUMINUM PRODUCTS COMPANY

(18) 6-ft fluorescent street light is claimed to give a constant source of virtually glareless light despite temperature changes. Designated form 206, it uses four 100-w, rapid-start fluorescent lamps. Light is reflected through a 6-ft plastic housing. The entire fixture weighs about 100 lb and houses its ballast. It is designed for downtown areas and whiteway lighting; may be operated on series or multiple circuits. Developed by General Electric Co., Schenectady, N. Y., the lamp is shown by Dr. A. F. Dickerson, general manager of the company's lighting and rectifier department

Fixtures

(19) Lightolier Inc., 11 E. 36th St., New York, N. Y.

Additions to ceiling and wall fixtures include outdoor and indoor types. The new outdoor Americana fixtures are made of molded birch plywood and wrought iron. Others in the line are provincial Americana styles of curved birch, fumed brass and glass; hug-the-ceiling glass Pacemakers and contemporary Lytecasters of brass. The Lytecaster illustrated has a mesh screen reflector below the bulb.

(20) EMERGENCY LIGHT—Big Beam, Model 2ATW, made by U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill., gives automatic floodlighting for a minimum of four hours. The two-head unit was designed for theaters, public buildings and other places where essential operations must continue. An enclosed relay automatically turns the emergency lights on when regular current fails and off when current is restored.

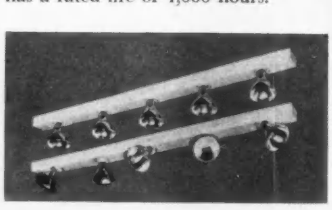
Lamps

(21) Duro-Test Corp., North Bergen, N. J.

The De Luxe Hi-Bay is designed for high-intensity lighting in working areas where the mounting height is 20, 30 or 40 ft. It is made in an R-57 bulb. The 500 w gives 8,000 beam candlepower; 800 w, 14,000 beam candlepower. Dust accumulation does not affect light output, it is claimed, since light is emitted from the bottom of bulb. Rated life is 4,000 hours.

The Little Giant is a newly designed 500-w Durex all-weather R-40 designed for general outdoor use. According to the manufacturer, its hard glass resists sudden temperature changes, moisture, flying insects and vibrations. Rated life is 4,000 hours.

A traffic signal lamp called the V-Beam is said to combine high brilliancy with long life. It throws beams of high intensity through the center and below the horizontal of the signal; has a rated life of 4,000 hours.



Display Lighting

(22) Neo-Ray Products Inc., 315 E. 22nd St., New York 10, N. Y.

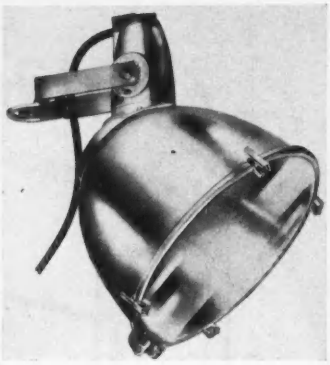
The Roto Strip is a shallow unit with inbuilt swivel sockets that adjust 90° in all directions through a 360° circle. The strip comes in stock lengths of 2, 3, 5 and 8 ft and in three series, No. 13 for standard installations, 13 C for corner mounting and 13 R with reflector.

Bare Lamps

(23) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Type BB bare lamp luminaire series for general lighting in chain stores and supermarkets is for use with two 40-w standard fluorescents or two 38-, 58- or 75-w slimlines. A swiveled socket assembly and a mounting connector simplify installation. The fixture has the new lead-lag fluorescent ballast.

(24) FIXTURE—Steberlite S-400 for the PAR-56, 100,000 candlepower lamp has been developed by Steber Mfg. Co., Broadview, Ill.



Flood Lights

(25) S & M Lamp Co., 119 W. 36th Place, Los Angeles, Calif.

New floodlights in the 750-1,500-w range with daylight focusing are available in three types: No. 952, wide beam 90°; No. 1052, medium beam 70°; No. 1072, narrow beam 15°. Models for open or closed wiring are offered in all three types.

Heads have totally enclosed, one-piece cast aluminum construction. Vertical and horizontal quadrants and front and back aiming sights are designed for easy focusing. The front sight can be used as a handle during servicing. Reflectors are 17¼ in. in diameter and are Alzak processed. A variety of mounting brackets is offered. Single and duplex slip fitters may be used on either 1½- or 2-in. pipe.

(26) SMALLER BULBS—Bulb size reduction in spotlights and floodlights has been announced by Westinghouse Lamp Division, MacArthur Ave., Bloomfield, N. J. The change, from a G-30 to a P-25 bulb, will apply to 15 lamps of various ratings. There is a ⅝ in. reduction in nominal bulb diameter and over-all length of medium screw base lamps has been reduced from 5⅛ to 4¾ in. Lumens per watt, life, light center length, price and standard package quantity are unchanged.

(27) PORTABLE BLACK LIGHT—The Portable Twin-Lite Blacklite is a hand model with a 5-in. handle and a 6-ft cord that plugs into a two-battery carrying case. The hand unit contains two 4-w lamps and peaks at about 3,600 Angstrom range. The plug-in battery set contains a 6-w fluorescent white light. The hand set can be plugged into any regular 110-v 60-cycle outlet for use in plants, shops, etc. Product of Norco Mfg. Co., 392 Bleecker St., New York 14, N. Y.

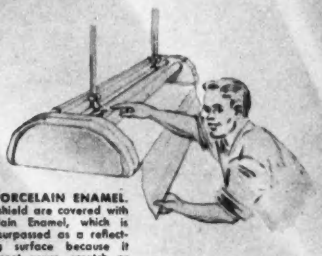
(28) FIXTURE—A portable fixture for use with its Heat Ray infrared lamps is offered by Solar Electric Corp., Warren, Pa. This bracket, which plugs into any regular outlet, has a shockproof heat-resistant porcelain socket, special rubber-covered spring clamps; universal joint for directing heat to desired angle.

now, a new high in seeing comfort

through sensationally-increased UPWARD LIGHT...

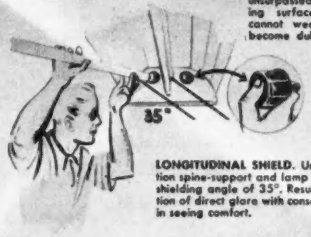
Now, approximately ¼ of light is directed **UPWARD** through a completely new, precedent-shattering concept of lighting unit design! The new Benjamin "Task-Master" is the modern solution to the brightness ratio problem. By combining greater upward flow of light with a new high of 35° in lamp shielding, "Task-Master" doubles, even triples, present standards for industrial seeing comfort. In addition to sensationally-increased **UPWARD** light and lamp shielding, "Task-Master" features revolutionary new, easier methods of installation and maintenance, such as those illustrated below. Send for **FREE** "Task-Master" Bulletin, giving further details. Write for Bulletin AD 5906. Benjamin Electric Mfg. Co., Dept. J, Des Plaines, Illinois.

BENJAMIN "Task Master"



DETACHABLE REFLECTORS are hinged to make possible easier, more thorough cleaning right on the fixture. They may also be detached and cleaned away from the unit. Available with sliding hangers, as shown.

"LIFE-TIME" PORCELAIN ENAMEL. Reflectors and shield are covered with genuine Porcelain Enamel, which is unsurpassed as a reflecting surface because it cannot wear, scratch or become dull.

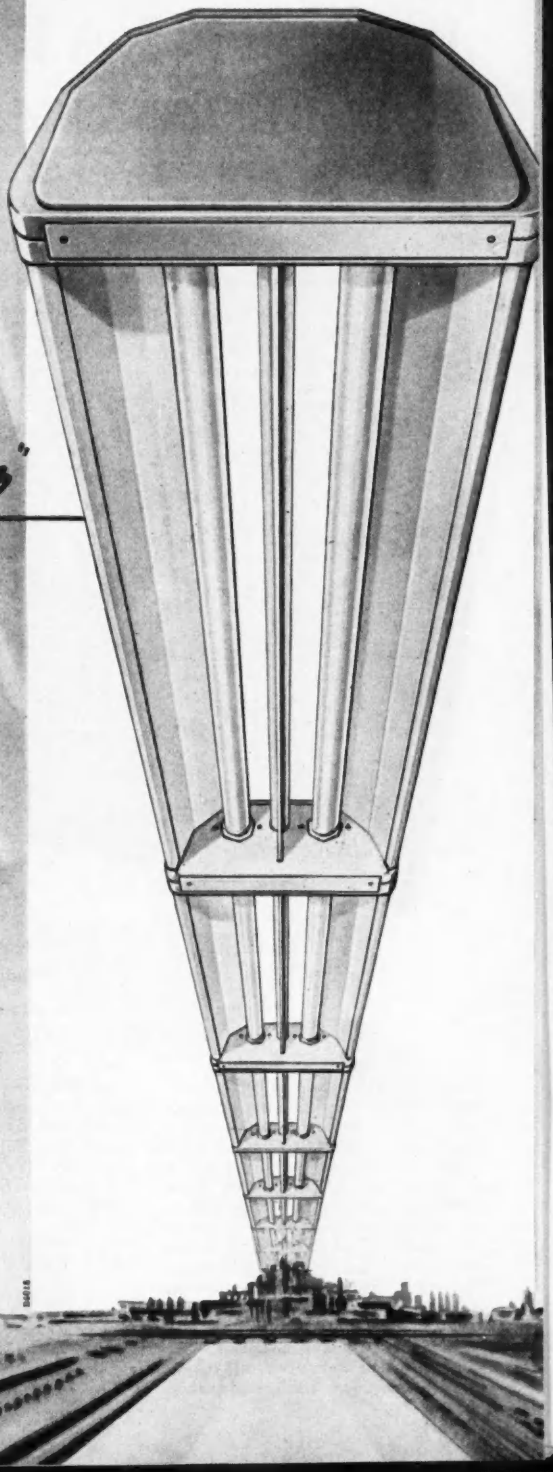


"SPRINGLOX" LAMPHOLDERS are standard equipment. These rugged, all-metal, lifetime lampholders facilitate lamping and relamping through patented spring design.

LONGITUDINAL SHIELD. Unique combination spine-support and lamp shield provides shielding angle of 35°. Result: great reduction of direct glare with consequent increase in seeing comfort.

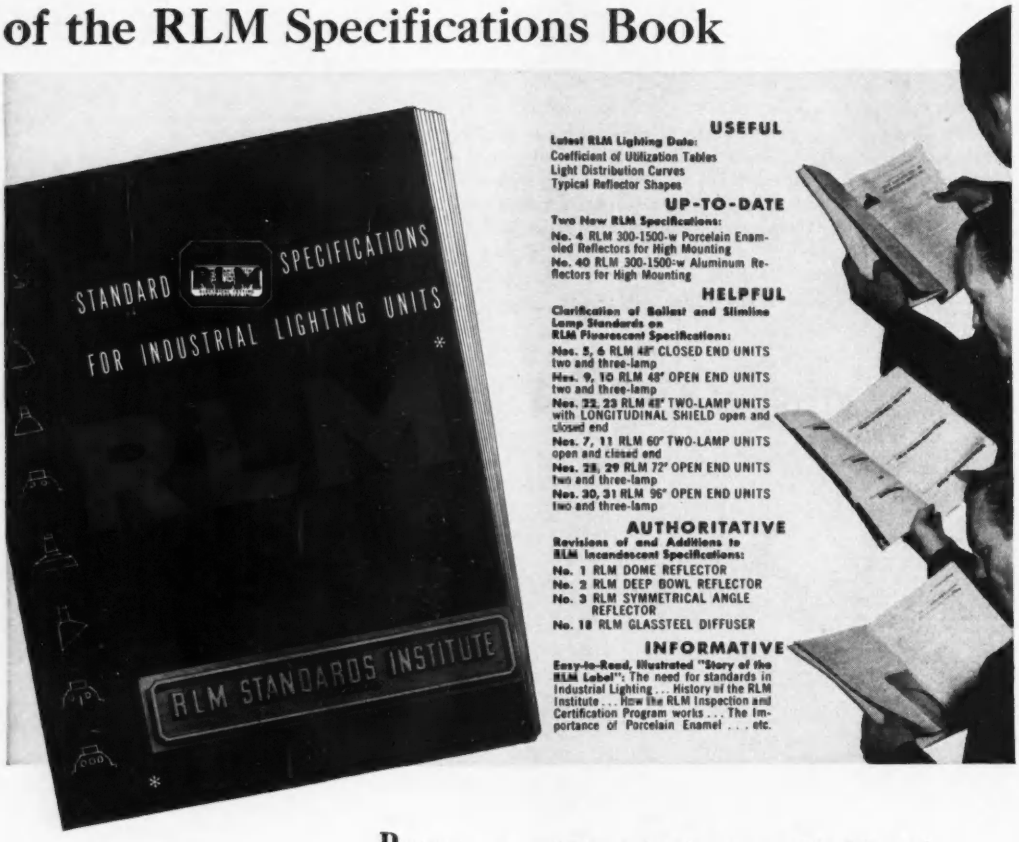
PRE-WIRED—NO WIRE SPLICING. Delivered with all connections made up to terminal block. Branch-circuit wire sizes already run through spine support, entire length of unit.

SPECIAL "HOOK-UP" DESIGN makes it possible for the installer to temporarily hang one unit on another while connecting the jumper wires to opposite terminal blocks.



D6018

The RLM Standards Institute Announces its 1952 ENLARGED EDITION of the RLM Specifications Book


STANDARD RLM SPECIFICATIONS
FOR INDUSTRIAL LIGHTING UNITS
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Coefficient of Utilization Tables
Light Distribution Curves
Typical Reflector Shapes
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Two New RLM Specifications:
No. 4 RLM 300-1500-w Porcelain Enameled Reflectors for High Mounting
No. 40 RLM 300-1500-w Aluminum Reflectors for High Mounting
HELPFUL
Clarification of Ballast and Slimline Lamp Standards on
RLM Fluorescent Specifications:
Nos. 5, 6 RLM 48" CLOSED END UNITS two and three-lamp
Nos. 9, 10 RLM 48" OPEN END UNITS two and three-lamp
Nos. 22, 23 RLM 48" TWO-LAMP UNITS with LONGITUDINAL SHIELD open and closed end
Nos. 7, 11 RLM 60" TWO-LAMP UNITS open and closed end
Nos. 28, 29 RLM 72" OPEN END UNITS two and three-lamp
Nos. 30, 31 RLM 96" OPEN END UNITS two and three-lamp
AUTHORITATIVE
Revisions of and Additions to
RLM Incandescent Specifications:
No. 1 RLM DOME REFLECTOR
No. 2 RLM DEEP BOWL REFLECTOR
No. 3 RLM SYMMETRICAL ANGLE REFLECTOR
No. 18 RLM GLASSTEEL DIFFUSER
INFORMATIVE
Easy-to-Read, Illustrated "Story of the RLM Label": The need for standards in Industrial Lighting . . . History of the RLM Institute . . . How the RLM Inspection and Certification Program works . . . The Importance of Porcelain Enamel . . . etc.

Published as a contribution to the advancement of the Science of Industrial Lighting, and as an aid to everyone who buys, sells, recommends or specifies Industrial Lighting Equipment.

You are invited to obtain your complimentary copy of this latest reference work on industrial lighting equipment. Architects, lighting engineers, electrical contractors, etc. recognize the RLM STANDARD SPECIFICATIONS BOOK as an authoritative aid in the specification, recommendation and purchase of industrial lighting units. It is the only industrial lighting book which helps evaluate lighting units in terms of illumination, construction and performance standards. Further, the RLM Specifications Book provides ready-made specifications which assure industrial lighting units that meet approved minimum standards of quality.

The 1952 Edition is designed to be even more helpful. It contains newly-approved specifications and latest revisions, and for the first time, valuable coefficient of utilization and light distribution data. Thus the user has at his fingertips the *complete picture* on each RLM unit. If your work is concerned with industrial lighting equipment, a copy of the 1952 Edition RLM SPECIFICATIONS BOOK is available to you without cost or obligation. Write RLM Standards Institute, Suite 815, 326 West Madison Street, Chicago 6, Illinois, for your free copy.

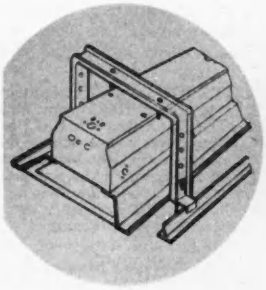
RLM STANDARDS INSTITUTE

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

E3756

ENGINEERING to the Nth POWER

In lighting as in aircraft the maximum degree of performance begins on the engineer's board. An exceptional recognition of Globe's engineering is implicit in the selection of Globe fixtures to light Convair's recently opened $3,000,000 Engineering Development Center.



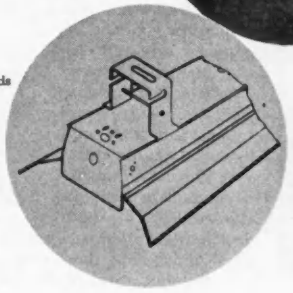
Globe's versatile UN mounting bracket is engineered for a variety of adjustments. Wing nuts move vertically on bracket legs.

Globe's UNG 503—96—430 troffers installed in this area result in an illumination level of 70 footcandles.

Convair's YB-60 all-jet heavy bomber

Globe, too, has behind its finished product an engineering program to integrate design, research and development— all directed to achieve the maximum... the Nth Power.

Continuous runs of Globe's K402—96—430 provide an overall illumination of 70 footcandles.



No matter what the spacing of studs from which stems are supported, Globe's sliding grip hanger will move into correct hanging position.

We will gladly send, upon request, complete engineering details and lighting data on Globe fixtures installed in Convair's Engineering Development Center.

GLOBE

LIGHTING PRODUCTS, INC.

2121 South Main Street Los Angeles 7, California

New York: 1710 Flushing Ave., Brooklyn

The SOUNDNESS of REVERE Design is reflected in ALL UNITS—Airport, Street, Service Station, Sports, Outdoor Theater, Marine and Industrial Lighting. The QUALITY is evident. REVERE units put New Life in the Lighting Business. Tie up with the COMPLETE REVERE LINE of Business Builders.

FAMOUS 4200
750-1000-1500 Watt Enclosed Flood. Truly a Masterpiece for long range lighting. Has degree markings—rotates for easy servicing.

FAMOUS 3800
The Pace Setter in Open-Type Floods for 300 to 1500 Watt General Service Lamps also 750-1000 Watt Bi-Post Lamps. Degree marked—Enameled Steel or Alzak Aluminum.

COMPLETE STREET LIGHTING LINE

ONE PIECE STEEL POLES SINGLE OR DOUBLE ARMS

REVERE HINGED STREET LIGHTING POLES ALSO HINGED POLES FOR SERVICE STATION LIGHTING

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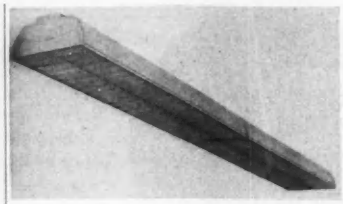
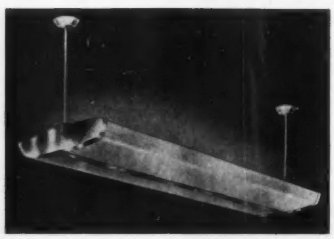
Indoor & Outdoor Lighting for Every Need



Fluorescent Fixture

(29) The Miller Co., Meriden, Conn.

The Lexington comes in 2- and 4-lamp, 4- and 8-ft types for general and slimline lamps. It has 45° lengthwise and 35° crosswise shielding with low brightness; rigid steel construction. A choice of metal, plastic and glass panel sides is offered.



Slimline Luminaire

(30) Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa.

The McKinley, a 4-ft luminous-indirect luminaire, is for installations requiring a low surface brightness. According to the manufacturer, it has an over-all efficiency of 76.5% and betters the low surface brightness specification of 0.5 f-c per square inch below 90°. The unit is wide and shallow in appearance; combined size and bottom panels of white, ribbed polystyrene, reinforced by a narrow longitudinal strip, give high reflectivity and low surface brightness. It is available in 4-ft units, 16 5/16 in. wide by 4 in. deep; is pendent mounted with H series hangers, which include end, junction and clevis hangers. Hangers grip the unit at any point along the raceway, allowing flexibility of installation to avoid beams and pipes. Additional information in bulletin 39-1.

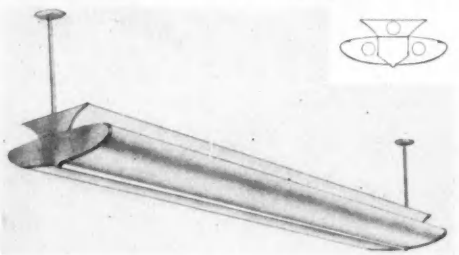
(32) NIGHT LIGHT—A night light introduced by Monowatt Department, General Electric Co., Providence 7, R. I., has a pin-it-up feature. It comes with a 6-ft cord and concealed suspension bracket and can be placed anywhere on the wall near an outlet. It has push-button switch, a C-7 7-w bulb and translucent ivory shade. Listed by Underwriters' Laboratories.

(33) LIFE RATING — Champion R-30 and R-40 reflector lamps and PAR-38 projector lamps now have an average rated life of 2,000 hours when operated at rated volts, according to Guy deLeuze, president of Panama Lamp & Commercial Co. Inc., 815 Howard St., San Francisco, Calif., Pacific Coast representative for Champion Lamp Works.

(34) RUNWAY LIGHT — A redesigned high-intensity runway light operates from three independent 6.6-amp series circuits, has a medium-intensity light in the top element and one of high intensity in each end. Top elements are used principally for good weather night landings and end elements are designed to penetrate fog, haze and smoke. The top element holds either a 30- or 45-w lamp and the end elements take a 95-w PAR-46 or PAR-56 high-intensity lamp. Made by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Luminous Indirect Luminaire

(31) Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.



Designed to give uniform widespread illumination with minimum contrast between fixture and ceiling, the P1273 series combines 3-lamp configuration with lateral upper reflectors and extruded plastic diffusing reflecting panels; is claimed to have an efficiency of 76% with distribution of light output 74.5% upward and 25.5% downward.

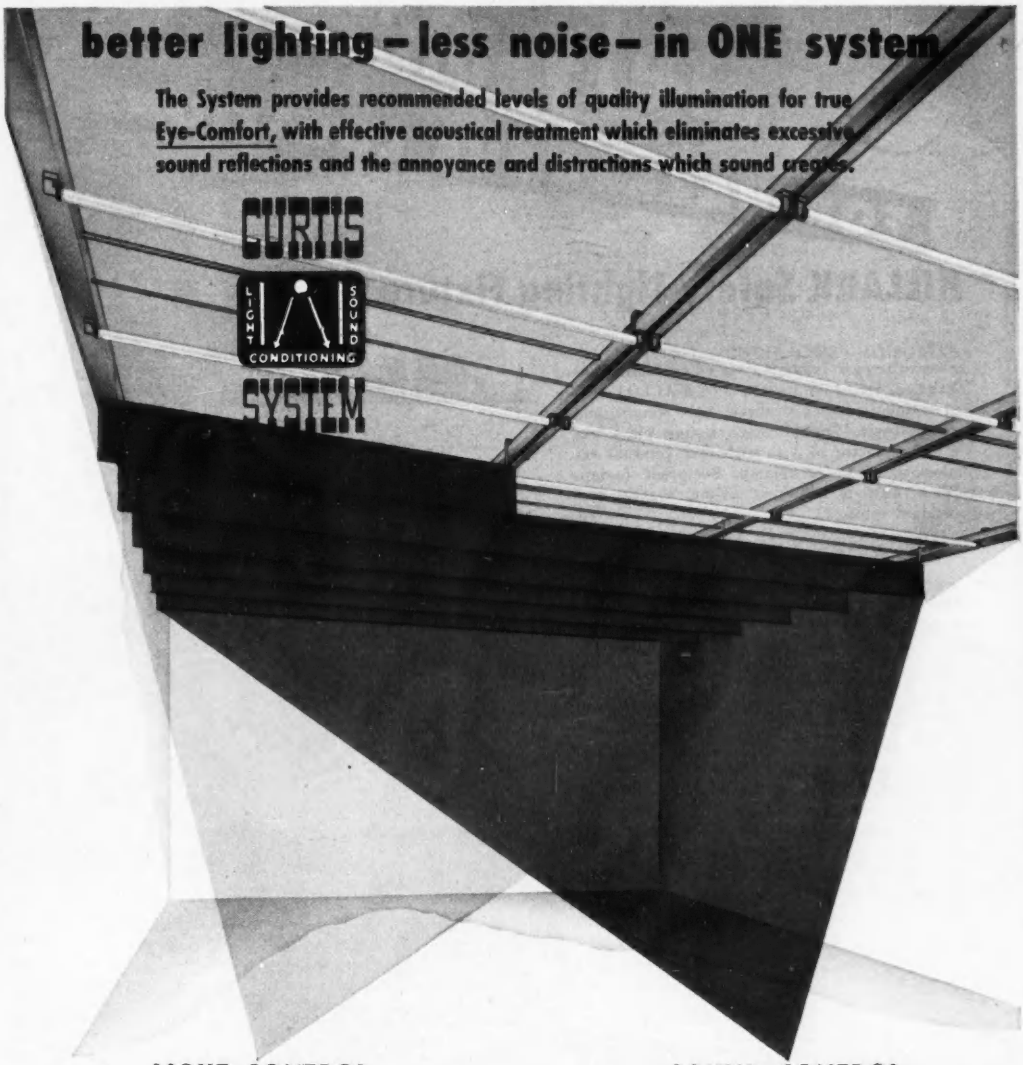
Installation and maintenance are easy, according to the manufacturer. Access to lamps, wiring and ballasts may be had without removing the plastic panels. However, panels may be snapped in or out when required.

The luminaire is 3⅛ in. deep at the plastic sections and 5⅞ in. deep over-all. It is available in 3-lamp configuration only, 40-w fluorescent and 48- and 96-in. slimline, 200 or 430 ma; pendant mounted only.

better lighting – less noise – in ONE system

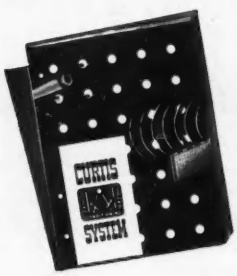
The System provides recommended levels of quality illumination for true Eye-Comfort, with effective acoustical treatment which eliminates excessive sound reflections and the annoyance and distractions which sound creates.

CURTIS LIGHT SOUND CONDITIONING SYSTEM



LIGHT CONTROL

The lighting system* of this revolutionary new method is an extendible arrangement of channels carrying the control equipment and wiring. T-12, 96-inch, 72-W. slimline lamps are mounted like ladder rungs between and at right angles to the Curtistrip channels. This system is supplied completely wired with ballasts and lampholders. All metal parts are finished baked white "Fluracite" enamel.



*Listed by Underwriters' Laboratories, Inc.

CURTIS LIGHTING, INC.
6135 W. 65th Street
Chicago 38, Illinois

SOUND CONTROL

The acoustical element consists of a series of vertical panels positioned between the fluorescent lamps to provide recommended shielding and adequate sound absorption. These panels are constructed of high quality, high reflectance, perforated acoustical material with washable white flame retarding finish, supported by a rolled steel frame.

A 20-page comprehensive bulletin with photographs and technical diagrams is available without obligation. Write Dept. L 16-18

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3 safety measures FOR HAZARDOUS LOCATIONS...

KILLARK Safety Lighting Fixtures

EXPLOSION-PROOF LIGHTS... A safe answer wherever inflammables or explosives are handled. Exclusive Killark ALUMALLOY construction combines strength, light weight, and compactness. Special heat-resisting glass has a safety factor of 4 to withstand internal explosions. Easy to relamp. Foolproof design. Sizes: 60W to 500W, in ceiling, bracket and pendant types.

VAPOR-TIGHT LIGHTS... Made in assembled models. Absolutely vapor-tight and weather-proof. Reflectors—available in standard dome, shallow bowl or angle styles—are designed to meet any lighting need.

DUST-TIGHT LIGHTS... Graceful "ledge-free" design prevents dangerous accumulation of dust. Close-fitting lamp parts provide a positive barrier against dust particles. Furnished complete with lamp receptacle and finished clear globe. Available in ceiling, bracket and pendant styles.

QUICK DELIVERY

WRITE for complete information on Killark Safety Lighting Fixtures.

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— BUT AT L.O.C.

Drawing on 108 years' experience in manufacturing top quality lighting equipment, the Miller Company has developed, and proudly presents, the LEXINGTON.

SPECIFICALLY ENGINEERED — to meet your need for evenly-distributed, softly-diffused classroom lighting of high efficiency, and with extremely low brightness. Not only is first cost low, but so is its overall cost — the very important consideration — Low Overall Cost.

NOTE THESE FACTS ABOUT L.O.C.

INSTALLATION COST: LOW — simplified by sliding clamp hanger mounting.

MAINTENANCE COST: LOW — only one ladder position needed for relamping — only ETL Certified ballasts used.

LONG, USEFUL LIFE: assured by sturdy Miller QUALITY construction — rigid "T" cross-section channel — extremely strong louver assembly, with cross baffles and side rails of one-piece steel, interlocked with center baffle and end plates.

FINISH — 89% reflection factor. Hot sprayed high-bake white enamel over steel rust-protected by 5-stage Bonderite process.

IDEAL classroom lighting — at L.O.C.

WRITE FOR FULL DETAILS ABOUT MILLER LEXINGTON

It is the newest addition to Miller's complete line of luminaires — Fluorescent, Incandescent, and Mercury—which cover a wide range of industrial and commercial lighting requirements.

Miller field engineers and distributors are conveniently located for nation-wide service.

THE miller COMPANY MERIDEN, CONN.
SINCE 1844

Field Sales Engineers

A. T. Bergeron, 52 Grenard Terrace, San Francisco, Calif.
E. J. Imhof, P. O. Box 832, Sherman Oaks, Calif.
C. W. McDaniel, P. O. Box 277, Menlo Park, Calif.
H. D. Lang, 6904 Grandview, Arvada, Colo.

BOOKS for ELECTRICAL MEN

HERE are four guidebooks for everyone who wants to keep up with effective practices in electricity and electronics. Every book listed is written by an outstanding authority who provides working information in straightforward language.

1 BASIC TELEVISION
PRINCIPLES and SERVICING

By BERNARD GROB, Instructor, RCA Institutes, Inc. 592 pages, 6x9, over 400 tables, charts, illustrations. $7.50.

An A-to-Z manual for everyone concerned with TV receiver installation and servicing. You get a detailed picture of both AM and FM circuits, operation and servicing. Simplified drawings, schematic diagrams, photographs and circuit-block treatment give you clear explanations of every topic. Covered are timely subjects like—oscilloscope operation, intercarrier sound receivers, deflection circuits, projection systems, simultaneous and sequential color TV, etc. Trouble-shooting charts show symptoms, causes and cures for over 50 typical receiver problems.

2 POWER CAPACITORS

By R. E. MARBURY, Westinghouse Electric Corporation. 202 pages, 6x9, fully illustrated, $4.50.

A clear discussion of the design, manufacture and use of power capacitors and the benefits you can expect when you apply them to specific circuits and systems. This book assembles a wealth of useful data, covering capacitors for 60 cycle power circuits, high frequency capacitors for frequencies up to 12,000 cycles, capacitors for high voltage AC and DC circuits, etc. Accessories, operating limitations, applications, power factor, and automatic controls are discussed thoroughly.

3 MAINTENANCE MANUAL of ELECTRONIC CONTROL

Edited by ROBERT E. MILLER, Weller Manufacturing Company; 304 pages, 6x9, 200 illustrations and circuit diagrams, 16 charts. $5.50.

A practical installation, maintenance, and service manual covering: electronic relays and timing relays, photoelectric relays, electronic motor control, electronic resistance-welding control, electronic temperature control systems, and sealed-ignition rectifiers. This guidebook explains reading of diagrams, use of test equipment, handling and storage of apparatus, use and adaptation of the oscilloscope, etc.

4 ELECTRICAL ESTIMATING

By RAY ASHLEY, Research Engineer, Electrical Contractors' Assn. of City of Chicago; Technical Director, National Electrical Contractors' Assn. 307 pages, 6x9, illustrated. $7.50.

Here's down-to-earth information on every phase of electrical estimating—training estimators, forms, tools and their proper use, time studies, plans and specifications, checking material quantities, preparing final bid sheets, markups, etc. Guides and sample estimates of actual constructions, taken from recent cases, are included. Data are applicable to all types of electrical construction, includes industrial, commercial, institutional, transportation, etc.

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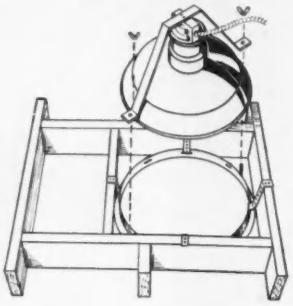
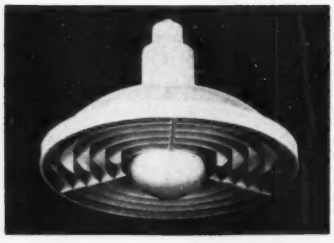


Gymnasium Light

(35) Quadrangle Mfg. Co., 32 S. Peoria, Chicago 7, Ill.

Remodeled for easier installation, this lighting unit for gymnasiums and other areas with suspended ceilings consists of a standard dome porcelain-enameled reflector with cast-aluminum socket fittings; supporting yoke of heavy strap iron; heavy wire guard; bolts, nuts, strapping and adjustment means; framing ring of structural angle iron for the opening in the ceiling.

The framing ring is permanently installed when the ceiling is constructed or remodeled. Attached with standard perforated strapping, it supports the entire weight of the unit. On wet plaster ceilings the lower flange of the ring is flush with the finished plaster and can be decorated at the same time. On dry ceilings the ring can be installed after the tile or board and will cover the raw edge and form a tight joint. No additional ring is necessary, it is stated. Design permits installation and servicing from above or below the ceiling as construction conditions require.



Portable Spot or Flood

(36) Silvray Lighting Inc., Bound Brook, N. J.

The Silver-spot Adapter is one of a line of beamed-lighting fixtures making use of the new 100-w A-21 silvered-bowl lamp. Designed for any porcelain ceiling receptacle and with swiveling device, it consists of a steel housing, porcelain adapter receptacle, aluminum reflector and concentric louver. With an over-all height of 5⅜ in., the unit gives complete shielding of the light source, 45° shielding of the reflector and low brightness on the louver. It can be relamped without removing the louver.

The silvered bowl collects all light below the filament and directs it to the reflector, which beams the light to the area being illuminated. A clear silvered-bowl lamp provides spotlight distribution; a frosted silvered-bowl lamp is used for floodlight.

Others in the line are the Silver-spot for recessed or surface-mounted beamed downlighting and the Silver-dot for pin-point downlighting.

Explosion-proof Fixtures

(37) Crouse-Hinds Co., Syracuse 1, N. Y.

This 200-w explosion-proof lighting fixture, type RCDE-8 is for flush mounting in ceilings. It comes with an 8-in. lens with symmetrical lighting distribution for general illumination or with prismatic lens with asymmetric distribution for special applications.

Former is for use where appearance is important, headroom is limited or surface or pendent-mounted fixtures would be an obstruction to overhead equipment. The latter has been used for lighting control boards and panelboards, in petroleum refineries and chemical plants, the fixtures being mounted in the ceiling adjacent to the boards with the lenses positioned to direct light on the boards.

For manufacturers' bulletins with additional information on these products, fill in coupon on page 66.

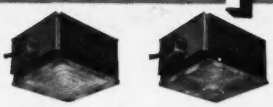
Guth

the complete line of fluorescents and incandescents

When you specify GUTH Luminaires, you get the benefit of more than a half-century's experience in pioneering better lighting. We make good specialized equipment for every lighting need...all *precision-planned* for economical installation and maintenance:

FLUORESCENT: Commercial and Industrial; Glass diffused, Eggcrate shielded, totally indirect, luminous indirect, recessed troffers and exposed lamp types.

INCANDESCENT: Commercial and Industrial; indirect, direct and semi-indirect types; also high bay reflectors, exit and utility lighting units.

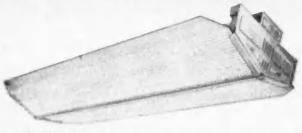


"ALL-SQUARE"...for recessing. One-piece die-cast frame. Light-leakproof. Widespread or concentrating lens...sizes 6½" sq., 8" sq. & 12" sq. PRE-WIRED. Removable top, and drop hinge bottom for servicing from above or below. Catalog 49.

▲ "ALL-SQUARE"

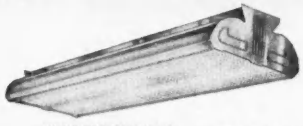
SEELUX ...totally indirect open bottom Luminaire for for Silver Bowl Lamps, with modern ALZAK concentric louvres; for stem suspension or close mounting. Bulletin 864.

▲ SEELUX®



ARISTOLITE ...hinged glass panels swing open for easy cleaning from floor with handy servicing tool. Also with center Eggcrate louvres. For 2, 3 or 4 40-watt or 2 or 4 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Write for Bulletins 812 and 820.

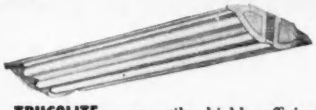
▲ ARISTOLITE®



NEW FUTURLITER ...with GUTH GRATELITE* the 48" long plastic louvre with 45 x 45 cut off for efficient vertical illumination and low brightness diffusion at angles above 45°. GRATELITE is made in sizes up to 48" long. Easy to install on single fixtures or complete ceilings. Available in opaque or transparent densities. Send for information.

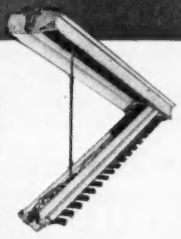
*Patent Pending

▲ NEW FUTURLITER®



TRUCOLITE ...versatile, highly efficient, semi-direct type; can be used open, with Eggcrate louvres or diffusing glass bottom. For 2, 3 and 4 40-watt lamps...also 2 and 4 4-ft. or 8-ft. SLIMLINE lamps. Ceiling or suspension, unit or continuous mounting. Bulletins 814 and 852.

▲ TRUCOLITE®



GUTHLITE ...the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 845.

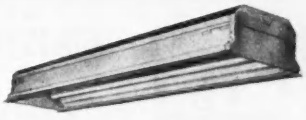
▲ GUTHLITE®

HY-LITERS ...recessed and surface types for PAR 38. Adjustable 45° from vertical in all directions. Can be used as individual units, or in conjunction with our fluorescent types. Bulletin 834.

▲ HY-LITERS

WYTE-LINER ...white inside and outside (takes gloom off ceiling). AIRFLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48.

▲ WYTE-LINER



"LITE-BLOX" RECESSED TROFFERS ...for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0"; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK reflectors if desired. Bulletin 869.

▲ "LITE-BLOX" RECESSED TROFFERS

GUTH 4-FT. SLIMLINE available in every GUTH fluorescent fixture

- no starters or starter troubles!
- easy to handle Single-Pin lamps!
- light in two steps almost instantly!

THE EDWIN F. GUTH CO. / ST. LOUIS 3, MO.

use CHAMPION LAMPS

FOR LIGHTING WITH MAXIMUM EFFICIENCY AT MINIMUM COST

CHAMPION Incandescent and Fluorescent Lamps have the uniform quality of illumination and lasting dependability in service that come only from years of specialization in the manufacture of lamps for industry. They COST LESS than any other lamps of equal quality . . . give MAXIMUM LIGHT for every cent of current consumed.

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INDUSTRIAL LIGHTING FIXTURES

...3 Complete Lines meet every safety lighting need!

VAPORTIGHT

For efficient illumination and maximum indoor and outdoor protection against non-inflammable gases, vapors, dusts and moisture. A complete line available in pendent, ceiling and bracket types from 15 Watts through 500 Watt sizes. Bases remain vaportight when globes are removed or broken in service.

WRITE FOR CATALOG No. 9048-10

EXPLOSION-PROOF

CLASS I, GROUPS C & D

For greater safety in hazardous locations wherever flammable materials are made or used. A complete line is available in pendent, ceiling, bracket and hand types—from 100 Watts through 500 Watt sizes. Standard conduit bases permit interchangeability of reflector globe assemblies.

WRITE FOR CATALOG No. H-47-10

DUST-TIGHT

CLASS II, GROUPS E, F & G AND CLASS III

For hazardous locations where flammable or explosive dusts are present. Streamlined design prevents dangerous accumulation of dust particles. Two exclusive design features facilitate easy cleaning and relamping. Standard pendent and junction box bases accommodate any style of fixture—globe—assembly interchangeably in either 100 Watt or 200 Watt sizes.

WRITE FOR DATA SHEET No. 7151-10

F4

RUSSELL & STOLL COMPANY, INC. • 125 BARCLAY STREET, NEW YORK 7, N.Y.

RUSSELL & STOLL

PRECISION-BUILT ELECTRICAL EQUIPMENT SINCE 1903

Ceiling Straps

(38) The F. W. Wakefield Brass Co., Vermilion, Ohio

An adjustable ceiling strap for single-stem lighting installations can be mounted with either one or two toggle bolts; has a maximum adjustment of 2 in. for out-of-line compensation. It is one-assembly, rustproof zinc-plated, 16-gage steel with a distortion point of 400 lb. According to the manufacturer, this strap will go on a ceiling outlet box stud or other preset stud; preserves the hook-on principle without adapters; is adaptable for fluorescent or incandescent single-stem hangers. It is shown above with the canopy now standard on the manufacturer's single-stem hangers.

Clamp Fixture

(39) Pacific Electricord Co., 3217 Exposition Place, Los Angeles 18, Calif. Dept. TEL

Called the Utility Adjust-O-Clamp, this lamp is cataloged No. 2340-20; has a heavy spring clamp for rough use, double ball knurled swivel that is claimed to hold firm in any position. It is chrome plated, with a rubber-covered bracket grip and 5½ in. bell-shaped steel reflector shade, cadmium plated. It comes with 20-ft flexible 18/2 SV cord with molded rubber plug.

here it is!

A COMPLETELY NEW APPROACH TO OVERALL LIGHTING...

Smithcraft area illumination

NOW . . . advanced design fulfills all the possibilities and benefits promised by overall lighting! Smithcraft Area Illumination is a complete fluorescent lighting system free from all the limitations and mechanical difficulties of previous attempts, yet it is not "custom built" to each installation. Skillfully engineered with unbelievable simplicity, Smithcraft Area Illumination when installed becomes a lighting "fixture" of limitless dimensions, shapes and patterns with unrestricted selection of shielding media and varied intensities within the system. For those who plan, recommend and install, here is an important new tool and business-producer; for the user, Smithcraft Area Illumination opens up exciting new possibilities for effect combined with illumination of unequalled quality.

architects

To the architect, **Smithcraft Area Illumination** presents a new opportunity for freedom of expression in the integrating of lighting interiors within interior design. Here is freedom of choice with no restrictions as to **size, pattern, intensity, shielding,** and **periphery.**

engineers

Engineers can now specify **and get** any required level of intensity. Or **different** intensities for different sections of an installation may be recommended to permit optimum usage of store or office areas. Alternating light, rows of lighting, or banks of lighting are possible because of flexibility of switching and a specially designed wiring system.

contractors

Ease and economy of installation are truly amazing! **Smithcraft Area Illumination** is actually installed in far less time than any combination of ceiling and illumination currently available. No careful dimensioning is required and no special tools, rules, or gadgets. From the time the hangers are in position on the ceiling to the finished installation, only a water level and small screwdriver are required.

owners

For those who own buildings and businesses of many kinds, **Smithcraft Area Illumination** is a **profitable** and practical investment. Versatile and adaptable, here is highest quality illumination combined with appearance and effect that **sells** and **produces.** Its ease of maintenance and adaptability to future plans and developments are factors that interest any businessman. Yet, its initial cost is comparable to that of a suspended ceiling and troffer system.

America's finest fluorescent fixtures **Smithcraft**
LIGHTING DIVISION
CHELSEA 50 MASSACHUSETTS

Send now for further information on Smithcraft Area Illumination.

KLEIN

Talk to any old-timer on the job and he'll tell you Klein equipment is his choice for comfort—for safety—for service. Look for the familiar Klein trade-mark on pliers, safety straps and belts, climbers, grips and wrenches. Klein has been serving the electrical industry "Since 1857."

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

Write for your free copy of the Klein Pocket Tool Guide today!

"Since 1857"

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3200 BELMONT AVE., CHICAGO 18, ILL.

BULLETINS ETC.

(40) LIGHT AND SOUND CONTROL—A 20-page illustrated bulletin available from Curtis Lighting Inc., Department 1 16-18, 6135 W. 65th St., Chicago 38, Ill., describes a lighting system that incorporates acoustical control. Extendible, the system uses T-12, 96-in., 72-w slimline lamps mounted between and at right angles to Curtistrip channels. The acoustical element consists of a series of vertical panels placed between the lamps.

(41) LUMINAIRE—The Task-Master, which features increased upward light and lamp shielding, is described in bulletin AD 5906 from Benjamin Electric Mfg. Co., Department J, Des Plaines, Ill. The manufacturer claims that this unit more than doubles present standards for industrial lighting.

(42) RECESSED SYSTEM—Mobilex, a flexible recessed lighting system designed for use as a part of its grid-type suspended ceiling, is described by Day-Brite Lighting Inc., 5412 Bulwer Ave., St. Louis 7, Mo., in bulletin OD-567. It comes in 2x2-ft units for two, three or four 20-w F lamps and in 2x4-ft units for two, three or four 40-w F lamps.

(43) BREAKER TESTS—"How Much Can a Breaker Take" is the title of an eight-page reprint from Allis-Chalmers Electrical Review. The article describes results of recent field tests conducted on a standard 69-kv, 1,500-mva oil circuit breaker. It is available for general release as 71R7855 from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

(44) CIRCUIT PANELS—An eight-page bulletin on Pushmatic Electri-Centers is offered by Bull-Dog Electric Products Co., Detroit 32, Mich. This bulletin, B-360, gives information and specifications on the manufacturer's XD and PB Electri-Centers using Pushmatic breakers.

(45) VOLT AMMETER—A descriptive folder on its type AC-1 volt ammeter is being distributed by Columbia Electric Mfg. Co., 4519 Hamilton Ave., N.E., Cleveland 14, Ohio.

(46) MOVIE—A folder telling about its 16 mm, 36-minute color sound film on Celite is available from Johns-Manville, 22 E. 40th St., New York 16, N. Y. The folder tells how the company puts the diatom to work by converting it into usable forms.

(47) SILICONE—A new booklet on silicone rubber has been published by General Electric's Chemical Division, Pittsfield, Mass. The 24-page bulletin, CDS-3, contains information on properties, applications, classes and design specifications.

(48) WIRE AND CABLE—An 186-page catalog of its line of more than 500 different types of wires and cables has been published by United States Rubber Co., Rockefeller Center, N. Y. Requests should be addressed to R. H. Turner. The catalog includes data on construction and operating characteristics for such products as control and signal cables, wire and cables for the railroad, building, telephone and mining industries. A detailed technical engineering data section also is included.

(49) CONNECTORS—A line of solderless wire connectors, cable and conduit fittings and wiring devices is described in a 12-page folder from Buchanan Electrical Products Corp., Hillside, N. J.

(50) MOTOR—Universal motor, EMC model 1120, rated 1/40 to 1/12 hp, has been announced by Howard Industries Inc., Racine, Wis.

(51) CATALOG—Illustrated Buyers' Guide No. 60-U-3 superseding No. 60-U-2 has been prepared by Day-Brite Lighting Inc., St. Louis 7, Mo. Net prices effective June 1 are included in this catalog.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after November 1

Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

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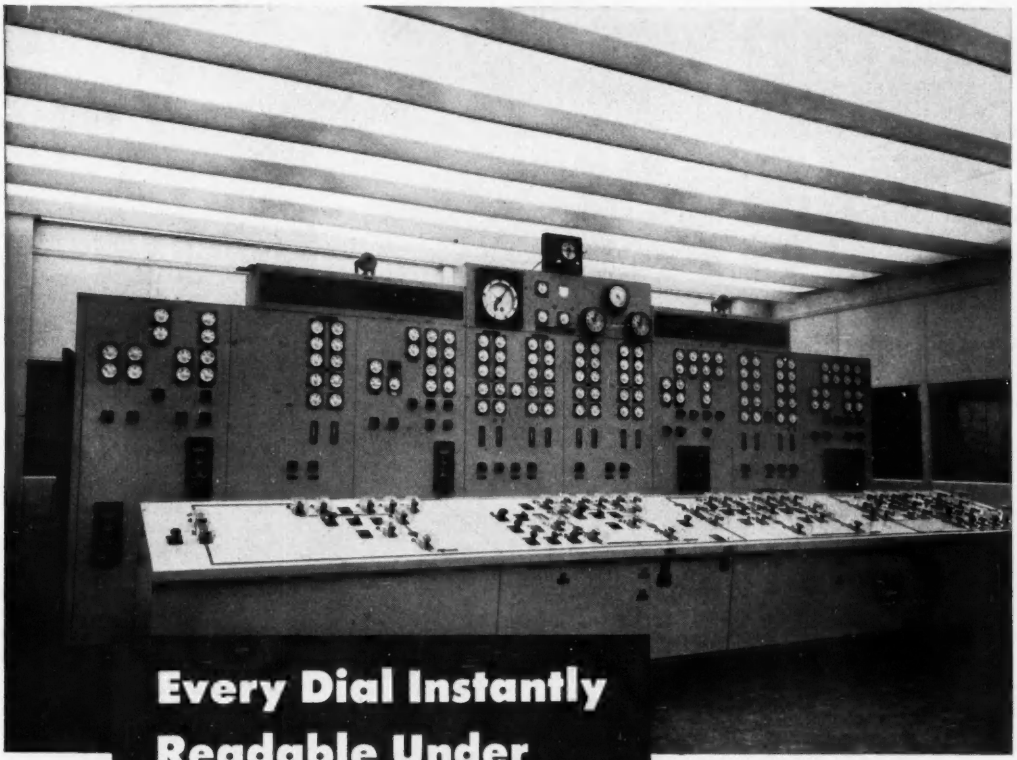
*Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.



Every Dial Instantly Readable Under a Wakefield Ceiling

Total Area:
Approximately 1,325 Square Feet

Location:
Central Control Room of a Turbine Room

Designed Initial Illumination Level:
95 footcandles

Designed Working Illumination Level:
55 to 60 footcandles

Lamps Used:
72" and 96" T-12 430 MA lamps

Consulting Engineers:
United Engineers and Constructors, Inc., Philadelphia, Pennsylvania

Licensed Agent:
Graybar Electric Company, Inc., Chicago, Illinois

Licensed Installer:
United Engineers and Constructors, Inc., Philadelphia, Pennsylvania

This is the central control room of the turbine room of a large midwestern manufacturer of electrical equipment. A Wakefield Ceiling provides virtually perfect seeing conditions for quick, accurate dial readings. Light is diffused so evenly through the corrugated Plexiglas "ceiling" that both direct and reflected glare are for all practical purposes non-existent.

Not only is light controlled by this Wakefield Ceiling but sound and air diffusion as well. Suspended acoustical baffles furnish excellent sound absorption; and conditioned air is delivered into the room through the multiple openings at the edges of the corrugated Plexiglas diffusers. The Wakefield "Three-Way" Ceiling is a revolutionary development in environmental control. For a detailed, illustrated booklet, complete with working drawings, write to The F. W. Wakefield Brass Company, Vermilion, Ohio.

Wakefield Over-ALL Lighting

ELECTRA'S HUSBAND

ELECTRA has always been a great admirer of the Earthworm Tractor Company stories, which have been periodic features of the *Saturday Evening Post* for many years. Just the other day we ran across a batch of correspondence in the electrical business that rivals some of the experiences of Homer Botts and Sales Manager Henderson. Here it is just as I showed it to Electra:

ABC Electrical Mfg. Co.

From: Sales Department 6-25-52
To: All sales offices

We have just received an emergency allotment of 15,000 lb of aluminum from DPA which was given to us because of the continued tight copper situation. After careful study of market conditions and because of the comparatively small size of the allotment we are fabricating all of this into a single size of conductor — 500,000 cir mil TW(Sn). Will you canvass all of your customers and prospects in an endeavor to dispose of this stock immediately.

(Signed) ANDERSON

From: Green, San Francisco 7-1-52
To: Anderson, Factory

I have just returned from a complete swing through the territory and found no enthusiasm among customers for 500,000 cir mil TW(Sn) aluminum wire. When discussing shipments and deliveries of copper with customers was almost universally greeted with statement, "Does your company want our business?" That is, polite customers said that. Cannot dictate to secretary what impolite customers said. However, will see what we can do.

(Signed) GREEN

From: Green, San Francisco 7-8-52
To: Anderson, Factory

Skinner & Ransom, Tacoma, can use 3,000 ft 500,000 cir mil TW(Sn) aluminum cable provided we can make early shipment. Please advise. Are only giving us this order because earliest delivery of copper is six months from competition (nine from us).

(Signed) GREEN

From: Anderson, Factory Sales 7-11-52
To: Green, San Francisco

Factory can make immediate shipment for Skinner & Ransom provided they have an AM number. Be sure to include AM number along with order.

(Signed) ANDERSON

From: Green, San Francisco 7-15-52
To: Anderson, Factory

Skinner & Ransom have no AM number, nor P. M. number either.

Here is their order No. 55-271 for 3,000 ft. 500,000 cir mil TW(Sn) aluminum cable. Hope you can ship this since Pacific Coast office needs billing because of factory discrimination on our back orders.

(Signed) GREEN

From: Anderson, Factory 7-17-52
To: Green, San Francisco

Tell Skinner & Ransom we will secure AM number for them. Order will be shipped from factory just as soon as this is obtained from Washington. Factory is not discriminating against Pacific Coast. Trouble stems from very tight copper situation which has been discussed in previous memos.

(Signed) ANDERSON

TWX-SFO-7/24/52
ANDERSON, FACTORY
SKINNER & RANSOM PHONED ASKING WHEN 500,000 CIR MIL TW(SN) CABLE WAS SHIPPED. SAID, "DOES YOUR COMPANY WANT OUR BUSINESS?" WHAT SHALL I TELL THEM?
GREEN, SAN FRANCISCO

From: Anderson, Factory 7-28-52
To: Green, San Francisco

Please request Skinner & Ransom to secure their own AM number so that we can ship 3,000 ft 500,000 cir mil TW(Sn) aluminum cable. Number can be obtained from Aluminum Section, Materials Division, DPA, Washington 5, D. C. Ordinarily this would take two weeks but we have arranged with Hicks in Washington office to see that request is expedited. Shipment will be made just as soon as we have customer's number.

(Signed) ANDERSON

From: Green, San Francisco 7-31-52
To: Anderson, Factory

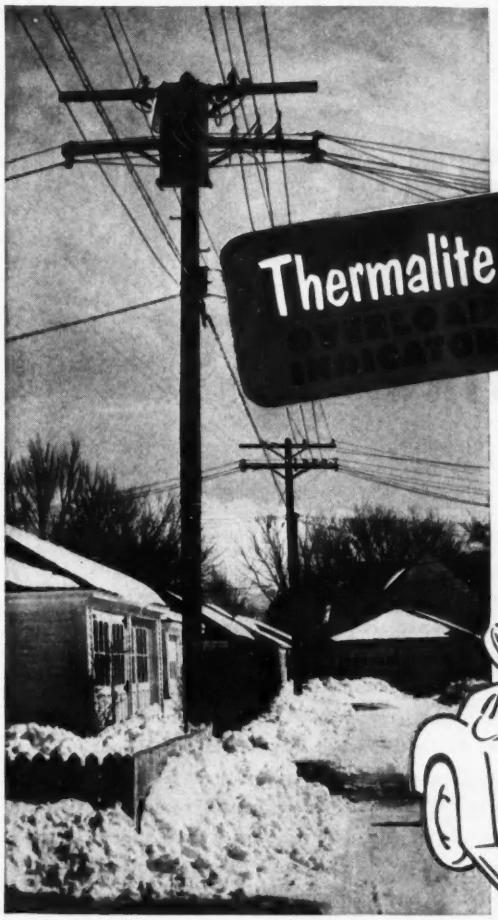
Customer has our number. Here is cancellation from Skinner & Ransom for 3,000 ft 500,000 cir mil TW(Sn) aluminum cable. Have placed order with Z-Y-Z Wire Co., who are making immediate delivery. So far as we now know we have no other prospects for this type of wire.

(Signed) GREEN

TWX-PHILA FACT-8/4/52
GREEN, SAN FRANCISCO
X-Y-Z WIRE IS BREAKING LAW BY SELLING SKINNER & RANSOM 500,000 CIR MIL TW(SN) ALUMINUM WITHOUT AM NUMBER. ADVISE CUSTOMER TO THIS EFFECT AND TRY FOR REINSTATEMENT OF ORDER BEFORE X-Y-Z CAN SHIP.
ANDERSON

TWX-SFO-8/4/52
ANDERSON, FACTORY
SKINNER & RANSOM SAY "NUTS." X-Y-Z MADE DELIVERY FROM LOCAL STOCK WITHOUT AM NUMBER. 500,000 CIR MIL TW(SN) ALUMINUM CABLE NOW BEING INSTALLED ON JOB. WE THINK FIELD SALES DID ITS JOB WHEN ORDER WAS SENT TO FACTORY. CANNOT DICTATE WHAT WE THINK FACTORY DID.
GREEN

After Electra had read through this correspondence, she commented that Mr. Green, unlike Mr. Botts, did not come out on top. I had to remind her that life is like that. Mr. Botts was a fictional character; he could always win. In real life, selling doesn't always work that way. Mr. Green knows it. He also knows that in dealing with bureaus in Washington, you can't win.



A Glance tells you it's Overloaded

Read How the *Thermalite* Indicator Can Save You Money in Transformer Protection and Utilization in Any Season . . . for Any Climate

WHEN THE BRILLIANT SIGNAL LIGHT of the *Thermalite* overload indicator flashes on, you can tell — at a glance — that your distribution transformer is overloaded. There is no interruption of service. Time-saving visual detection like this can save you hundreds of man-hours on costly surveys. It will help to eliminate transformer burnouts and service interruptions.

Important Advantages Save Money

Simple in operation . . . the warning light is actuated by a thermal device in the top oil. The light snaps on during excessive overload periods and remains on until turned off by an external handle.

The *Thermalite* indicator will stretch the dollars you spend for transformer protection. It's low in original cost, dependable and requires no maintenance. It is engineered, calibrated and installed at the factory.

Learn more about this visual, inexpensive way of detecting transformer overloads by calling your nearby A-C sales representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3793

Thermalite is an Allis-Chalmers trademark.

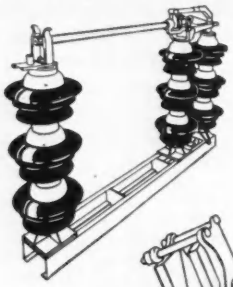
The Thermalite overload indicator is available on distribution transformers 100 kva and smaller, 15 kv and below.

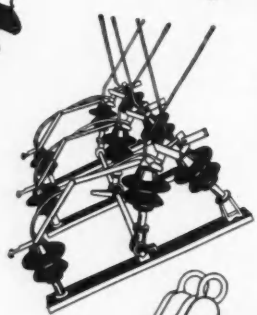
ALLIS-CHALMERS

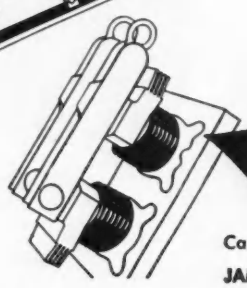
FOR DEPENDABLE TROUBLE-FREE PERFORMANCE

install ELPECO

POWER SWITCHING EQUIPMENT







For over 40 years the Elpeco line of high-quality power switching equipment has been known for its outstandingly dependable and trouble-free performance. Constant research and redesign have enabled Elpeco to *anticipate* rather than meet the ever changing demands and requirements of the electrical industry. Particular buyers, who have specified Elpeco products over the years, know that when they buy Elpeco Indoor and Outdoor Disconnect Switches, Air Break Switches, Indoor and Outdoor Bus Supports, Bus Ducts and Substations . . . they are getting the finest, most modern equipment on the market. All Elpeco products conform to NEMA and AIEE standards for performance.

A new series of bulletins, completely illustrating and describing each item in the Elpeco line is now available. Let us know the particular type of equipment in which you are interested. We'll be glad to send the appropriate bulletins by return mail.

ELPECO

DIVISION OF ROLLER-SMITH CORP.
BETHLEHEM, PENNA.

Canadian Affiliate:
JAMES R. KEARNEY CORP. of Canada, Limited, Guelph, Ontario

NOW... G-E Super Coronol* rated at 85 C copper temperature

NEW HIGHER RATING APPLIES TO ALL SIZES FOR 0- TO 8000-VOLT SERVICE

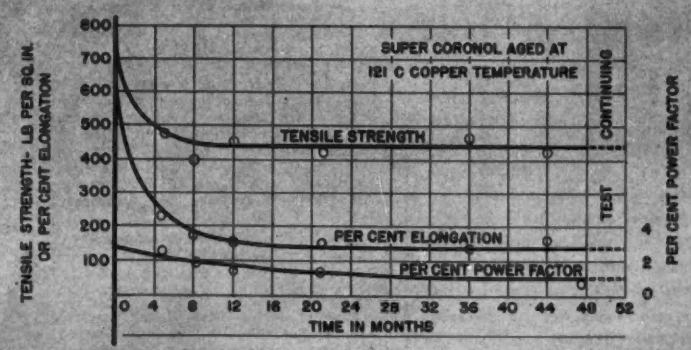
General Electric announces that effective immediately it is basing the ratings of all Super Coronol power cables for service up to and including 8000 volts on a permissible maximum copper temperature of 85 C. To our knowledge this is the highest rating ever announced for a solid dielectric power cable in this voltage range. For voltages above 8000, ratings continue to be based on 80 C.

The new temperature ratings mean that Super Coronol cables are now capable of carrying up to 12 per cent more power, continuously, than old-style ozone-resisting rubber-type compounds rated 75 C maximum.

This higher rating is a conservative increase, based on life tests of many cables taken from regular production. Most severe, and at the same time, most impressive of these tests involves cable held continuously under load at a copper temperature of 121 C. This test is now nearing the end of its 5th year. Both physical and electrical properties have been stable since the 20th month. In view of such results, the new rating is still extremely conservative—*and can safely be applied to all Super Coronol cable now in service at potentials up to 8000 volts.*

G-E cable specialists in your area will be glad to help you calculate just what this new rating means in current-carrying capacity in any specific installation—both for continuous loading and for emergency overloads. Or you may wish to write Section W45-925, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

This curve shows the results of aging tests on Super Coronol cable to date. The tests are being continued. Note that these results were obtained at a copper temperature of 121 C. Following the rule that insulation life is doubled for every 8-10 C decrease in temperature, the ample factor of safety in the new ratings is obvious.



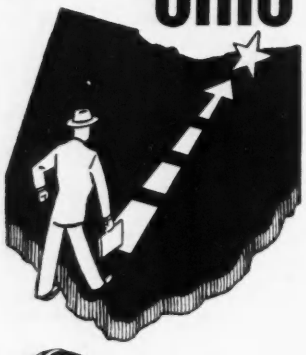
*Registered Trade-mark General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

Single conductor-Geoprene jacket | Single conductor shielded Geoprene | Pre-assembled aerial cable | Mine Power Cable | Two-conductor concentric lighting cable

So HE TOOK HIS MOTOR BRUSH AND CARBON SPECIALTY PROBLEMS TO "OHIO"



The illustration above merely depicts one of thousands of executives and maintenance personnel who have availed themselves of "OHIO'S" complete engineering and advisory services. Since 1916 we have been furnishing to industry motor and generator brushes and carbon specialties of standard requirements as well as specially engineered construction. Our Motto, "FROM RAW MATERIALS THRU TO THE FINISHED PRODUCT" speaks for itself.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St.
Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

LETTERS TO THE EDITOR

To the Editor:

I am glad that you thought enough of my blast about the "Big Squeeze of Big Government" to put significant extracts from it on your editorial page of the July issue of ELECTRICAL WEST.

On the theory that the best defense is a good offense, the "Big Squeeze" article is proving timely in view of Truman's vituperative attacks on the private utilities. The reaction from the article has been favorable and substantial all over the country, so I am encouraged as to its having some beneficial effect on the cause of private enterprise.

I am rather surprised at the lack of understanding as to what is going on in the Pacific Northwest on the part of some of the publishers of national magazines. This is evidenced in the attached copy of editorial from the July 1 issue of *Forbes Magazine*, and in the following quotation from a letter dated June 27 sent to a friend of mine by Edward Anthony, publisher of *Collier's*:

"I have read with interest and some astonishment the McLaughlin article which you sent me. He rises to quite a climax in his final pages, and paints a very likely and convincing picture of government controls going berserk."

Thanks a lot for your effective "bulls-eyeing" of the basic content of my article. I think what has happened in this region can serve as a real object lesson for other parts of the country.

FRANK MCLAUGHLIN, President
Puget Sound Power & Light Co.
Seattle, Wash.

To the Editor:

In Electra's Husband in your July 1952 issue, which I read because it was right across from a client's ad, you mention that 2% of sales are made on the first call, 3% on the second, etc. Could you tell me the source of these figures. I would like to expand them into a promotional piece for Allis-Chalmers salesmen and distributors.

ROBERT L. CHOPE
Compton Advertising Inc.
Milwaukee, Wis.

To the Editor:

One of the projects of the Insulated Conductor Committee, American Institute of Electrical Engineers, is a bibliographical index dealing with papers on wire and cable which were published during the past 20 years in leading technical magazines here and abroad. At the last committee meeting in Montreal, Can., I volunteered to take on ELECTRICAL WEST as part of this cooperative work and I have just submitted my index cards to the chairman of the Subcommittee on Bibliography.

When I took on the assignment I was, and still am, connected with Anaconda Wire & Cable Co. in the east. Soon thereafter, things developed which will bring me into the Northwest, as research electrical engineer to Kaiser Aluminum, Spokane, Wash. It is obvious that, in digging through these volumes, I confined my attention not only to wire and cable. In fact, this work gave me a bird's-eye view of the electrical development in the West, whose scope and speed is certainly unique, and where the true pioneer spirit does NOT shun trying new things such as, for instance, bundle conductors for extra high voltage transmission or a 230-kv submarine cable crossing.

Coincidentally, this activity — digging through your volumes — gave me a profound respect for the standard, the diversity, topic-ness and generally balanced way of reporting in your magazine. It reflects a first-class editorial policy and direction. . .

I am certainly looking forward to taking up work and residence in "the most highly electrified section of the U. S."

L. F. ROEHMANN
Research Engineer
Electrical Laboratory
Anaconda Wire & Cable Co.

To the Editor:

When are you going to start issuing a Spanish edition of ELECTRICAL WEST? I ask, because of the recent evidence that we have been receiving of the reader interest that you enjoy in the Philippine Islands.

No doubt you will recall that I reported at Bass Lake that we had an inquiry regarding membership from W. A. Chittick & Co. Inc., electrical distributors in Manila, as a result of our advertisement on your back cover. This membership has since been received.

Recently, we got an air mail letter from the fire chief of Manila (it cost him 90 centavos for postage), asking for a copy of our booklet, "Your PCEA, How It Operates," which he likewise saw offered in another of these back cover ads.

I thought that you would be interested to hear of these evidences of the pulling power of ELECTRICAL WEST advertising. We also had an inquiry from Alaska, which referred to one of these pieces of copy.

VICTOR W. HARTLEY
Managing Director
Pacific Coast Electrical Assn.

To the Editor:

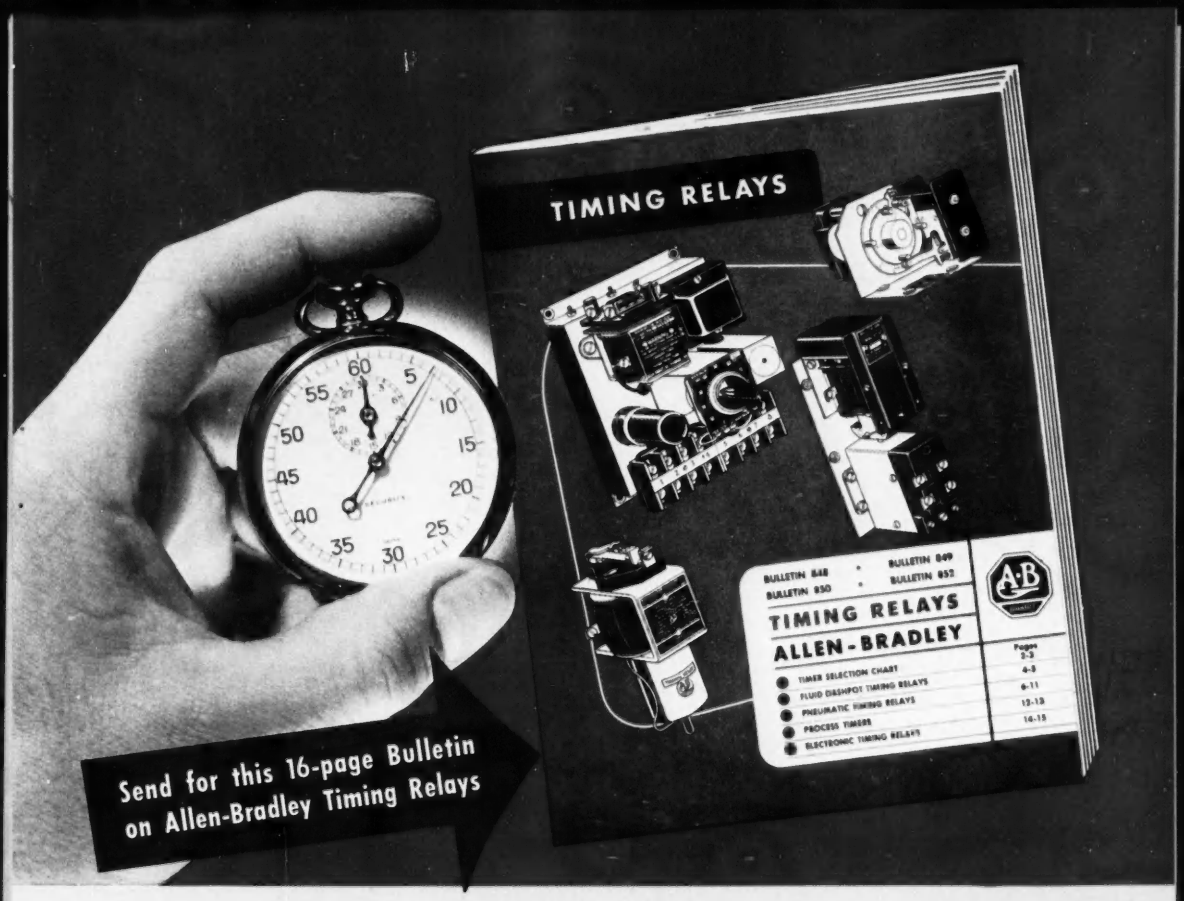
On page 91 of your July issue there is an illustration of some plant construction being done by the Pacific Gas and Electric Co. This illustration was used in connection with the Coffin Award story.

Would it be possible for us to borrow this photograph? . . .

You probably are wondering what the National Adequate Wiring Bureau wants with a plant construction photograph. . . . We would like to use it in connection with other pictures of generating, transmission and distribution subjects on the front cover of our annual report to the electrical industry. The title of this book will be "WHAT HAPPENS When the Electrical Industry Gets Behind Adequate Wiring?"

This report is intended first of all for the members of NEMA, who provide all of the funds for the headquarters operation of the bureau. The answer to "What Happens?" will be given in the form of a statement by various electric utility people about load growth which takes place when homes are adequately wired, and the illustrations described above will be used to symbolize the expansion of markets for products used in generating and transmitting electricity. . . .

FRANCES ARMIN, Director
Education and Promotion
National Adequate Wiring Bureau



FOUR POPULAR TIMERS • SIMPLE AND DEPENDABLE

PNEUMATIC

Bulletin 849 pneumatic timing relay is a long life timer of high repetitive accuracy. Has an adjustable pneumatic bellows for regulating the tripping time. Time delay minimum—⅛ second; maximum—3 minutes. The operation of this pneumatic timer is easily changed from "on delay" to "off delay." A reliable, compact timer that is available in a wide variety of contact arrangements. It can be furnished in open type or in enclosures of various constructions.

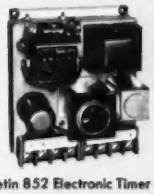
FLUID DASHPOT

Bulletin 848 fluid dashpot timing relay is a low cost, adjustable timer for applications not requiring a high degree of accuracy, such as for timing electrically operated valves, motor starting sequences, etc. Time delay minimum—2 seconds; maximum—30 seconds. Single pole contacts, either normally open or normally closed. Silicone dashpot fluid assures consistent action at low ambient temperatures. Furnished in open type for panel mounting, or in pressed steel and cast iron enclosures for every service.

MOTOR DRIVEN

Bulletin 850 Style L motor driven timer is a precision switch of the maintained contact type. It alternately opens and closes two switch units 2, 3, 4, or 6 reversals per min. Ideal for controlling reversible machinery such as laundry washers or other processing equipment. Run and drift time easily adjusted. Silver alloy contacts.

ELECTRONIC



Bulletin 852 Electronic Timer has a thyratron tube used as a combination a-c rectifier and electronic switch. In 8 timing ranges from 0.025 sec. to 2 min. Accuracy 2% of setting. Ideal for machine tools, high frequency heating equipment, and photographic printing.

STANDARD ENCLOSURES FOR EVERY SERVICE

NEMA Type 1

NEMA Type 4

NEMA Type 7

ALLEN-BRADLEY

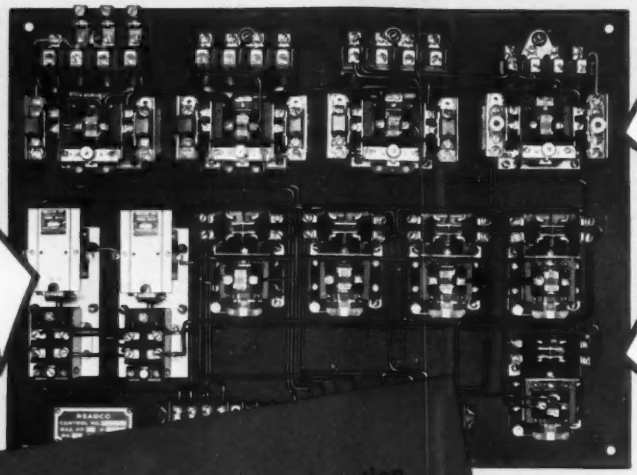
QUALITY

TIMING RELAYS

A-B Quality

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

6-52—MR



CONTACTORS for Power Circuits

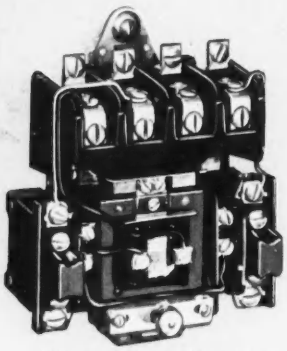
TIMING RELAYS for Sequence Control

RELAYS for Control Circuits

For Continuous Trouble Free Plant Operation

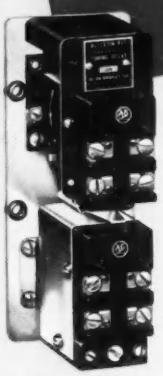
use ALLEN-BRADLEY RELAYS and CONTACTORS

NO CONTACT MAINTENANCE



Bulletin 709 Solenoid Switch

A compact across-the-line starter, with or without enclosures, in eight sizes. Thermal relays give reliable overload protection.



Bulletin 849 Timer

Pneumatic timers adjustable ⅛ sec. to 3 min.

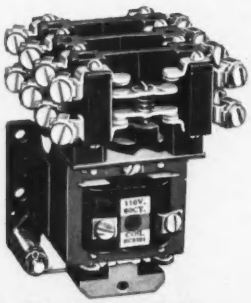
If you are laying out a new automatic manufacturing process, you can avoid costly operating shutdowns by using time tested controls . . . like Allen-Bradley trouble free relays, contactors, and switches.

Not only does the A-B trademark assure you of quality control units . . . with long, maintenance free life . . . but you will like the day in and day out consistency of their switching performance.

The variety of A-B units for handling interlocking or other special controls for manual, semiautomatic, or automatic operation will please you.

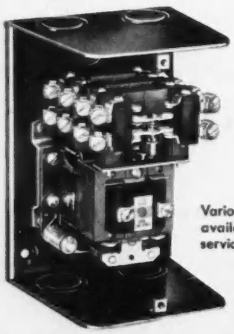
The compact Allen-Bradley handy catalog is a valuable reference guide in selecting the control components for any sequence control operation. We shall be glad to send you a copy.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.



Bulletin 700 Universal Relay

With four N.O. and four N.C. contacts. Good for millions of operations.



Various enclosures are available to meet any service requirements.

A-B Quality

ALLEN-BRADLEY

RELAYS & CONTACTORS

QUALITY

6-52—M

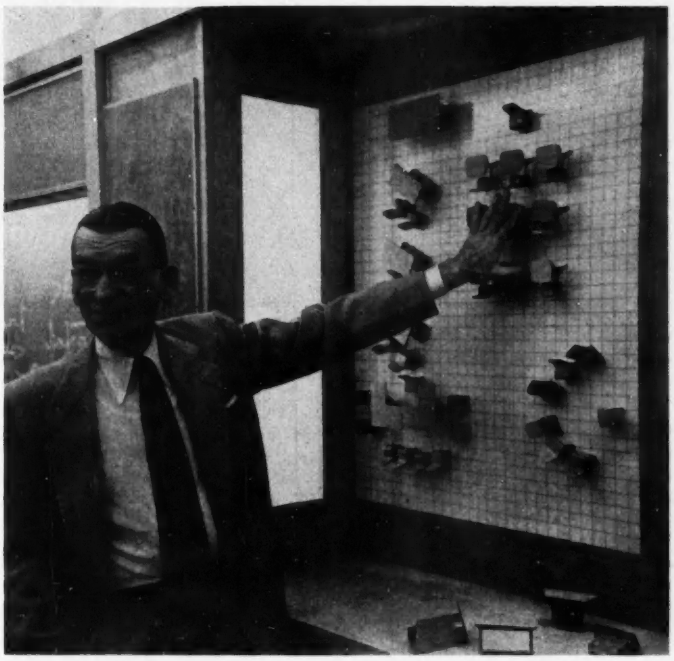
SEPTEMBER 1952 Vol. 109, No. 3

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

School Planning Laboratory for Administrators at Stanford

SHOWS EDUCATORS THE LIGHT



Dr. D. B. Harmon at a magnetic board used to work out seating in respect to lighting

Educate the school administrators better and better-lighted schools will come naturally. In a sentence, that is the promise that comes from the first year's successful operation of the school-planning laboratory of the School of Education at Stanford University under the direction of Dr. James D. MacConnell, its associate dean.

What is this school-planning laboratory? What is its purpose? How is it used to train school administrators? What is the lighting part of the program? What significance does such a training have for the future of school building in the West? These and similar questions are best answered by an appraisal of this first of such school-planning laboratories to be set up in the nation.

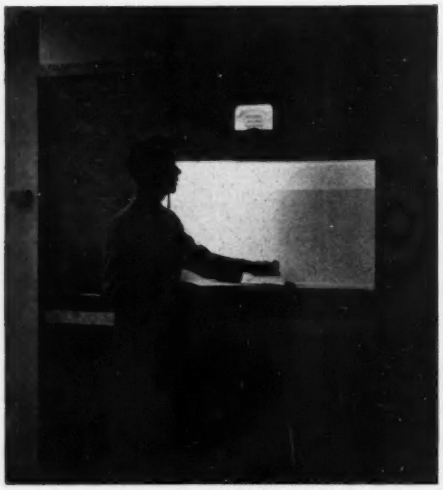
The laboratory at Stanford is the first center aiming to educate school administrators, both young and old experienced ones, using a laboratory supplied by some 75 manufacturers with materials and equipment to observe, experiment with and apply to the study of better schools. Two more such laboratories are now being planned in connection with the schools of education and courses in school administration. One will be at Indiana University, the first state-owned and publicly financed program; the other at New York University which, like Stanford, is a private university.

In brief the Stanford School of Education offers courses in school administration for graduate master's and doctor's degree candidates in Education, students preparing for a school administration career. But also during conference sessions this information is available to those who want the training without college credit. This includes school superintendents, administrators, principals and teachers (usually working toward higher degrees), architects, builders, school board members and others. To assist many of the latter, special school-planning conferences are conducted, this year on a series of Fridays during a summer session.

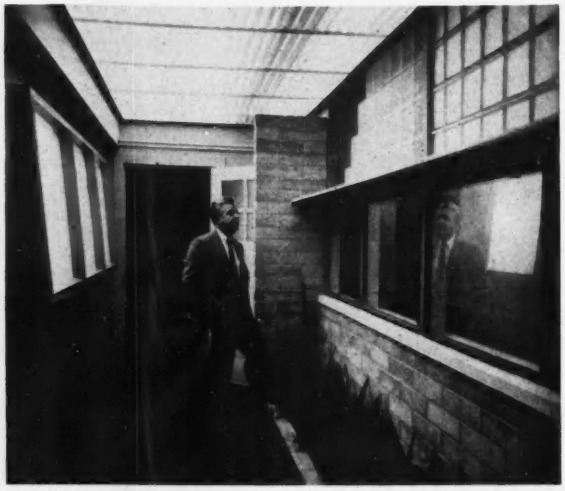
What the laboratory aims to do is to find what classroom environment best promotes the health, mental and physical growth, and desire to learn of school children. It seeks to discover and learn how to eliminate forces that impair growth, learning and health. It offers a means to test new materials and methods, and report the information thus obtained.

Dr. Darell Boyd Harmon, consulting educationalist and Stanford visiting professor, puts it this way: "Architects and engineers sometimes express a feeling that we may be invading the field of architecture or engineering. But what we are actually trying to define is human function.

"Taking lighting as an example, the laboratory does not seek to define any engineering approach whatever either to lighting or to fixtures. It is a visual performance approach that is made.



Claude Winkelhake, fellowship student, using the light box to illustrate the transmission of the various glasses and blocks



Dr. James D. MacConnell in the approach corridor where top and side daylight through the windows can be simulated

We seek to establish light density patterns as related to the child while performing sustained tasks in the classroom. There is a difference in the visual center of performance of an adult from that of a child when learning.

"Most laboratories in the lighting industry are designed either to produce the light itself or its control by means of fixtures. This laboratory is designed to study the achievement of those performing under the lighting. Therefore in this laboratory there are provided the means to vary and direct all kinds of light density patterns and to experiment with them in relation to learning.

"We have no business invading the field of either the architect or the engineer. But we do have a major interest as educators in the function of the human being in the total school environment, as well as a responsibility to improve this environment. What we learn of that we can pass on to the engineer. From it he can define the method of providing the lighting densities where and when needed.

"None of this laboratory is concerned with physical specifications of the equipment. It is only concerned with the psychophysical specifications for an environment conducive to learning. What we are after, it seems to me," said Harmon, "is something more like an entropy curve of desirable densities of temperature, humidity, air movement, lighting intensity and brightness, sound—a performance curve of the total environment—that the engineer and architect can interpret in school-building design and equipment. From this will come real working classrooms that will help children to learn. We have had too much school building that is designed as a community monument or an architect's creation."

Dr. MacConnell has called upon the experience and theories of Dr. Harmon of Austin, Tex., a nationally known consulting educationalist, now on the Stanford faculty as a visiting professor. It was he who, as director of the Division of School Health for the Texas State Department of Health, brought forth research showing how a child's body may grow along lines of stresses conditioned by poor lighting, glare, faulty heating, poor seating and desk positioning.

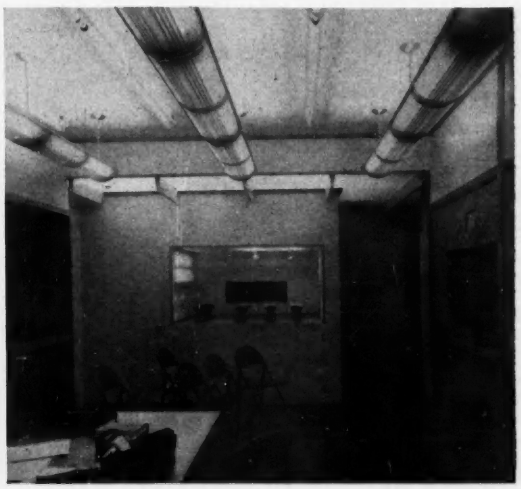
Hence the heart of the school-planning-laboratory group of some six rooms, located in the basement of the education building, is the specific coordinated classroom-seminar area. It is in this area, equipped with controls for a maximum variety of conditions, that seminar groups can actually experience and test the effects of varying degrees of brightness, color and temperature. Along its walls are inserts for the demonstration of (1) control of natural light, (2) control of artificial light, (3) surface control of light and color, (4) heat and ventilation control, (5) chalkboards and tackboards, (6) furniture arrangement and equipment, and (7) a model classroom with movable miniature furniture and equipment and controlled light from an adjacent "sky" room.

Then the approach corridor to this classroom seminar is made to demonstrate outside daylight conditions. One wall is a mock-up of the exterior of a classroom, with clear glass windows in the lower portion and glass brick the upper portion.

In the coordinated classroom seminar seven industries furnished the equipment and established a fellowship to study the effects of physical factors in the classroom upon the development, health and learning of school children. These companies are American Seating Co., American Structural Products Co., Minneapolis-Honeywell Regulator Co., National Chemical & Mfg. Co., Pittsburgh-Corning Corp., F. W. Wakefield Brass Co. and Weber Costello Co. The Stanford laboratory is the first major collaboration between education and industry toward a common goal of school-plant development along intelligently planned lines. Being a private university this collaboration was possible. Yet the contributors have put no strings whatever upon their research contribution.

In the other portions of the laboratory, which has a fundamentals laboratory, a materials section and a conference area, other materials have been furnished by some 75 manufacturers. These include building and insulating materials, etc. Among these in the electrical industry represented are F. W. Wakefield Brass Co., C. T. Bakeman Co., Colonial Electric Products Co., Electric-Aire Engineering Corp., Leader Electric Co., Pittsburgh

Model classroom has versatile light control equipment to simulate daylight and fixture lighting combinations, and see results



Coordinated classroom-seminar with model room, light box and the means for direct, indirect and luminous ceiling lighting

Reflector Co., Smoot-Holman Co. and Sylvania Electric Products Inc.

In the coordinated classroom, switching control is so arranged that the light-density pattern can be changed in a ratio of from 9 to 1, all the way from the dramatic lighting for displays to the high level diffused illumination for critical seeing, from wholly direct to luminous indirect or to wholly luminous ceiling. The area is so built that all the equipment can be changed or altered whenever wanted.

In the display cases or sections around the room, it is arranged so that the observer can manipulate all the controls and take readings of the results. One light box has means to test various light distribution patterns from prismatic glass or glass blocks, or to experiment with color and reflectances. Then in the room itself the selection of either direct or indirect units, each wired on separate circuits on separate control, can be tried in a variety of ways. Near the model classroom is a section of luminous-acoustical ceiling.

A similar section of Wakefield luminous ceiling of Plexiglas in the approach corridor to the seminar room can be used to simulate overhead daylight from the sky in measuring the transmission of daylight through the windows or glass blocks of the mock-up of a classroom exterior along the wall. Illumination in back of the wall can be used to measure the light losses from the room to the outdoors. The wall display cases on the facing wall can simulate light directed from the afternoon sun. Control of the lamps, which are mounted on close centers, gives a variety of conditions similar to overcast sky to bright sunlight, in distribution of light if not in intensity. The wall surfaces become targets for measurement.

Instead of working in terms of foot-candles and foot-lamberts, measurements of light intensity and brightness, those directing the research in the laboratory like to think in terms of light density. They feel that if uniform density can be attained in all three dimensions at the working height of the child then the brightness pattern can be altered within reason by change of decoration pattern.

Significance

The long-range benefit of such an educational program for school administration people, rendered more realistic and practical through laboratory experience with materials and equipment along with the conference theory and general information, is obvious. It makes for better-trained school executives, better informed as to products, their uses and limitations and sources.

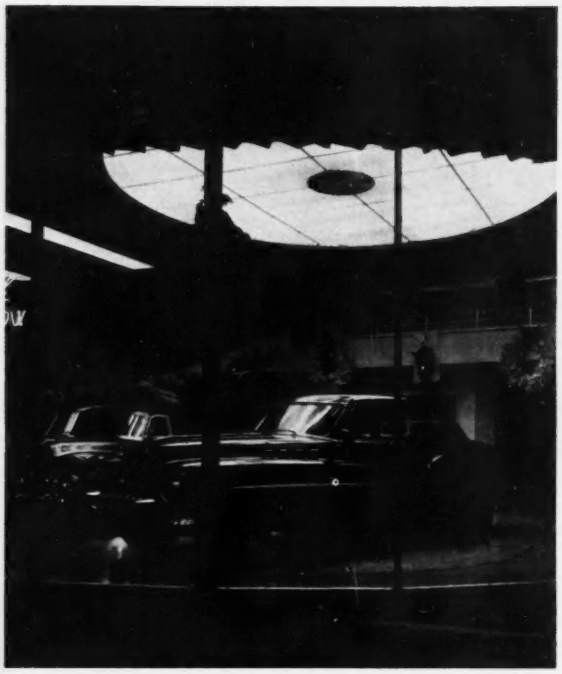
Other products of the program are school-planning consultation service and facilities for research projects.

Already a number of school districts in California and some in Montana and other Western states have called upon the School of Education to make comprehensive surveys of their districts and suggest education specifications to make for better school construction. Such plans always make sound recommendations as to desired light levels for anticipated tasks and other facilities. Usually, modernization of existing school buildings is included also, again with recommendations that lighting be modernized for a coordinated classroom environment.

Grants Finance Research

Research projects are contracted for by interested groups or companies who have need for study on problems related to the functional use of school equipment and materials. It is with such grants for research that important financial support to the laboratory is obtained, as well as from school-planning consultation services provided by the laboratory and its resident and associated consultants.

The 1952 summer conference on school planning just closed on Aug. 15. Among those known to the electrical and lighting industry who were on the staff of speakers were: Charles Bursch and Charles Gibson of the California Division of Schoolhouse Planning; Leland H. Brown, professor of electrical engineering and head of the illuminating engineering laboratory at Stanford; Paul Schmidt, district illuminating engineer, General Electric Co.; C. L. Crouch, technical secretary, Illuminating Engineering Society, New York; Robert Burnham, F. W. Wakefield Brass Co., Ohio; John Walsh, illuminating engineer, Pacific Gas and Electric Co.

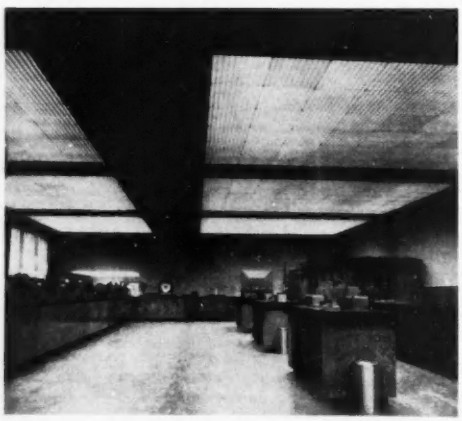


Mueller-Harkins—Tacoma

Streichers—San Diego

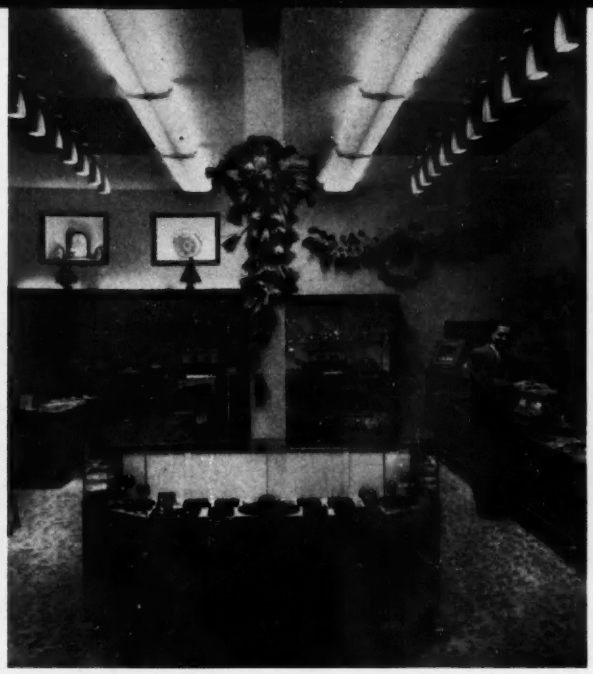
A TASTE OF WESTERN LIGHTING

First National Bank—Springfield



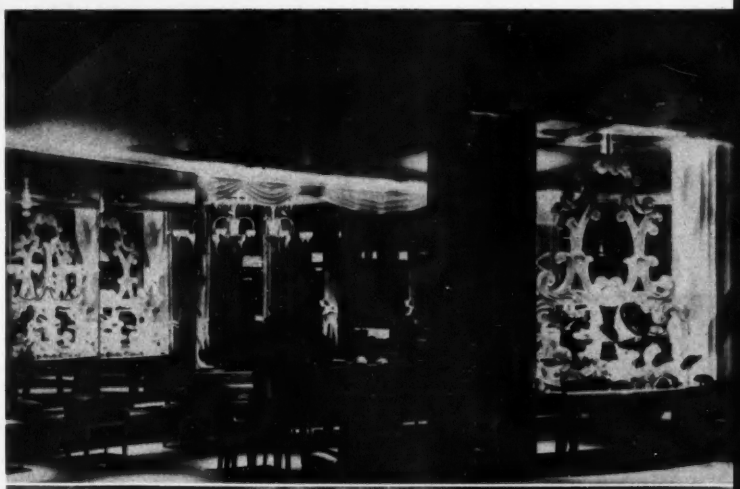
Louvered ceiling made up of 170 32x32-in. sections of louvers above which are 120 8-ft, single-lamp Sylvania strips on 2-ft centers above the Flexi-Module ceiling, in the First National Bank at Springfield, Ore. Lighting levels of 60 f-c over working areas and 45 f-c between sections are thus obtained

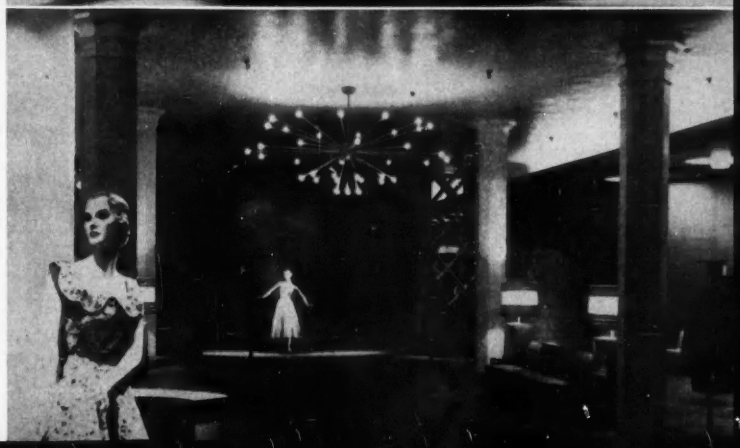
Scotty's—Lewiston



Bowers Jewelers—La Jolla

Neusteters—Denver





At Mueller-Harkins Buick Service Center in Tacoma, Architect Silas Nelson had Wire Electric Co. install fluorescent lamps above two circular louverall ceilings, one of which is shown, over circular salesroom areas, making an unusual decoration . . . At Streichers Shoe Store in San Diego, Milo Berenson, designer, used a mirror to give depth to a small store. It repeated the six 12-ft, two-lamp fully shielded troffers on 7-ft centers. C. M. Thompson, SDG&E, was lighting consultant and Capitol Electric did the installation . . . Scotty's women's apparel shop in Lewiston, Idaho, has a 6x6x6-in. plywood louverall ceiling over the fitting area, concealed lamps over the racks, and dramatic lighting from flush mounted and louvered downlights over the rest of the store. H. Brant Gessel of Walla Walla was architect . . . Bowers Jewelers in La Jolla was a merit award winner at the recent lighting exposition. D. F. Curtis, SDG&E, designed the lighting and Goodwin Electric of La Jolla installed Sylvania Trimline fixtures in two rows with 40 Swivelier Torpedo units for downlight sparkle at the showcase counters, getting 190 f-c on top of the cases, 115 f-c in general illumination . . . In Denver, Neusteters, a long established department store, has been remodeling one department at a time. Reliable Electric Co. has installed Gruen decorative fixtures for elegance of appearance but with a cove and indirect ceiling bowls for general lighting; downlights for drama

Durham Meat—Mountain View

Boeing—Seattle

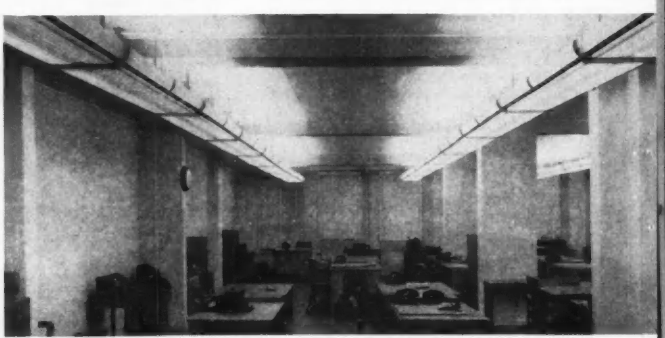
Typical Examples of Good Lighting for Plant, Office—

Durham Meat Co. at Mountain View, Calif., packs two million pounds of meat for the armed services. This packing room must be washed down daily. Hence Craftlite vaportight Plexiglas shielded fluorescent fixtures from Buckles-Smith, San Jose, solved breakage and sanitation problems

Boeing Airplane Co., Seattle, found no fixture it wanted, without plastic, glass or louvers, yet shielded, so Cecil Tice, illuminating engineer, designed one and Ruby Lighting of Los Angeles built it. It uses single slimlines in a two-lamp fixture 18 in. apart in baked enamel channels as shown

Idaho Compensation Co. at Coeur d'Alene, preferred to make lighting fit into the ceiling of acoustical tiles inconspicuously with Columbia slimline troffers having Holophane Controlens, lamped with 75-w slimline lamps. Private offices had a single troffer down the center of the room

Idaho Compensation—Coeur d'Alene



Southern Title—San Diego

Southern Title & Trust Co. in San Diego remodeled an old office area of 3,300 sq ft, using 45° louvered bottom, low brightness side paneled slimline units on stems 1½ ft from the ceiling. There were 34 units installed, using 430 ma slimline lamps. Average foot-candles over the area are 75. Architect was Jack R. Lewis of San Diego; electrical contractor was Pacific Electric. Walls had a 49% reflection factor light green; acoustical ceiling with 76% reflection factor and marbelized green floor of 12%. The furniture was light in tone

—or Reading and Recreation

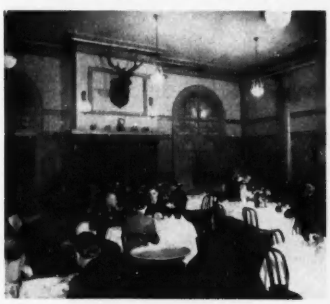
Christian Science Reading Room—Los Angeles

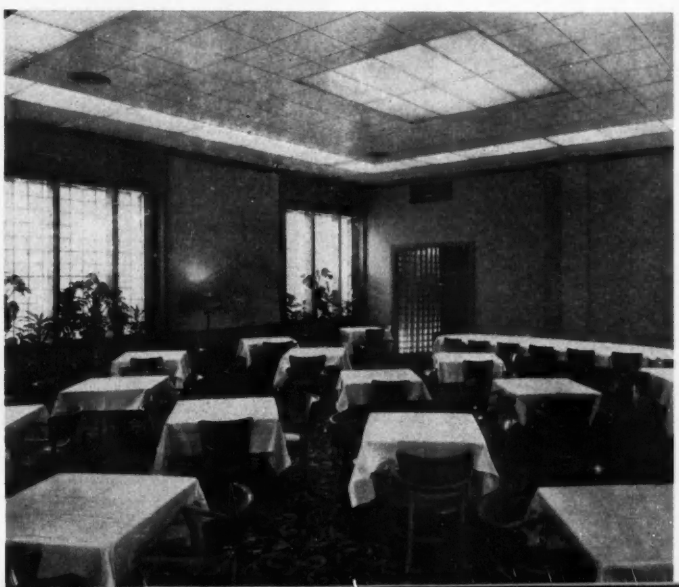
The Christian Science Reading Room at 621 S. Olive St., Los Angeles, shown above, is lighted by 31 Skylike units of Smoot-Holman Co. make, recessed flush with the acoustical ceiling on approximately 7-ft centers, lamped with 300-w silver-bowl incandescent lamps to give an average intensity of 33 f-c. The floor is cork, both in color and composition, walls dark coral, furniture light finish, almost blonde. Department of Water & Power lighting engineers assisted with the design

Elks Club—Seattle

At left, the relighted game room at the Tacoma Elks Club, where old low-hung fixtures over the tables were replaced by ceiling troffers in an acoustical ceiling. Light colors on walls and floor give the room a new look of cheerfulness and light

The old look of the dining room was like the picture below, thought adequate in its day but unattractive by modern standards. So the Elks at Tacoma had Wire Electric Co. install a center louvered light chamber and a rectangular encirclement of the room, with circuiting to give color on one control, white on another. A number of combinations of mood lighting are possible from this simple circuit arrangement





Office Lighting Exhibit

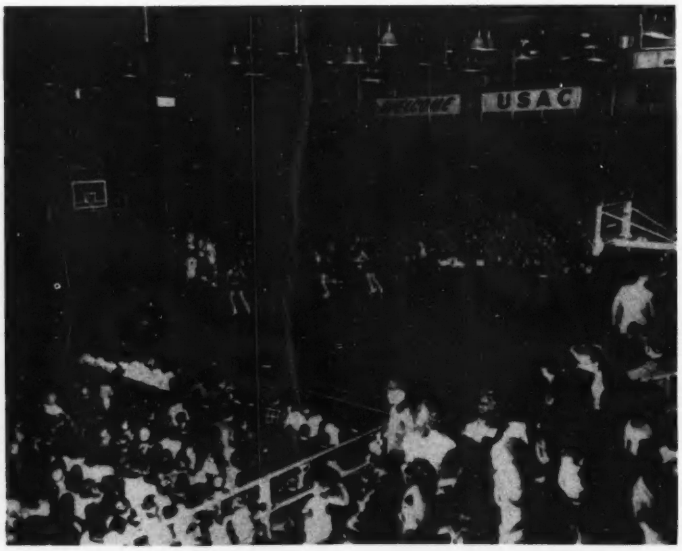
VERSATILITY

Pacific Western Gear & Tool

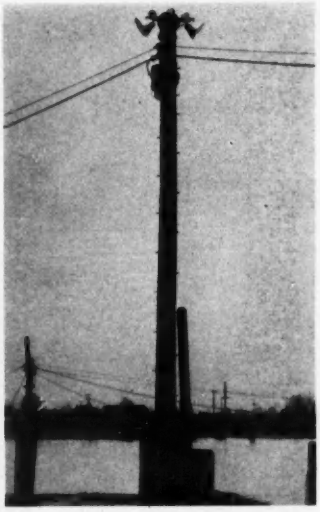
Office Lighting Exhibit was designed by C. M. Thompson and used by San Diego Gas & Electric Co. at fairs to dramatize the difference between old diffusing-bowl poor-quality lighting and modern luminous ceiling (Sylvania); changing on a flasher . . . Alternate mercury and incandescent Miller high-bay units 28 ft from the floor, 13x15-ft spacing, installed by Coopman Electric, give Pacific Western Gear & Tool Co., at Belmont, 45 f-c, 3 ft from the floor. Below: The 1905 lighting at San Francisco Presidio being replaced by new G-E units

Color-corrected mercury Westinghouse J-H1 lamps in pairs in Miller high-bay reflectors, 32 in all, supplemented by 14 1,000-w clear incandescents, mounted 30 ft from the floor provide 30 f-c and enable Brigham Young University to take basketball films at F-2.8, 24 frames a second; and this picture of fast action. L. A. Hansen Jr. of Westinghouse aided in the engineering that brought about the result

San Francisco Presidio



BYU Field House



Clusters of floodlights mounted on dolphins are out of the way of operations but close enough to provide fair lighting for night

BOOMING LIGHTING for SAFETY

Faced with improving safety conditions for three-shift operation of the booming ground, a floodlighting installation, unique in the lower mainland of British Columbia, has been installed at the plant of MacMillen and Bloedel Ltd., Vancouver Plywood Division and Canadian White Pine Division, Vancouver, B. C. The ground, approximately 240x1,100 ft, is located on the north arm of the Fraser River.

The former method of lighting was by five 1,000-w floods mounted on the shore on towers and 200-w RLM dome and angle reflectors on whatever poles and spars were handy in the raceways. Obviously, the illumination was not too good because of improper spacing and insufficient wattage.

The present method of giving a general illumination of 1 to 3 f-c (varying from periphery to the center line of fixtures) is provided by installing clusters of 1,500-w incandescent floodlights on specially driven dolphins spaced at 160 ft. The fixtures are General Electric L-69 sports floodlights with medium and wide beams set so as to provide best light coverage. Mounting height is 35 ft above high water. Local lighting of 5 to 8 f-c in drag-saw areas, etc., is provided by allowing existing RLM's in these sections to remain in use.

Only glare is when pond is not filled with logs, which is rare when operations are on

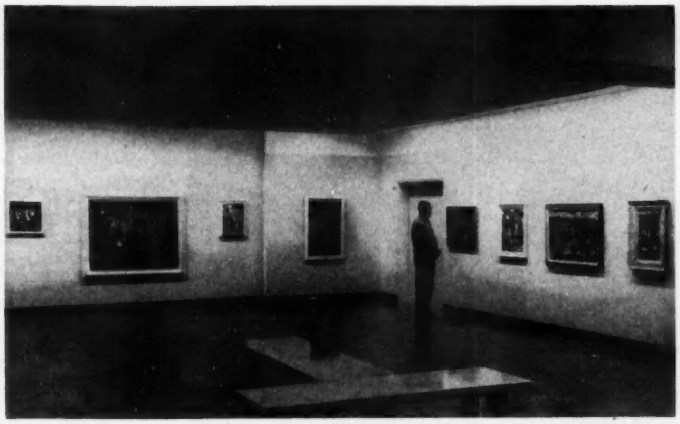
Relamping and servicing of floods is easily and safely done by means of pole steps and a special handhold arrangement at the top of the pole. Replacements are raised and lowered, very simply, by means of an ordinary bucket and rope. Voltage drop is a first consideration here. It is overcome by stringing 460-v cable connected to a 3-phase supply from a 11,560/460-v plant substation. A 460/230/115-v dry-core transformer is mounted at each light center to step down the 460-v distribution to 115 v for lighting. A magnetic switch at the 3-phase distribution center controls the floods. Operating data for the floodlighting only are as follows: f-c, 1 to 3; number of floods, 32; wattage (EA), 1,500; load (kw), 48; rate per kwh, .73c; cost per hour, .35c.

The installation gives light about equal to modern street lighting, improves safety of working conditions and allows more accurate grading and sorting.

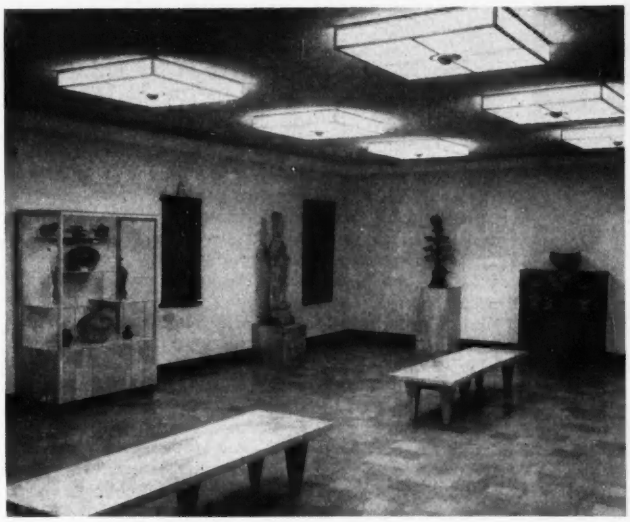
LIGHT ON THE LAW AT BERKELEY

Law takes lots of reading. Law students spend long hours digging out precedents from past cases. And most law libraries are made to look like ancient dim cloisters. But at the new School of Jurisprudence building at University of California, Berkeley, a new precedent has been set. The law library is well lighted. It is 42.9 ft wide, 139.9 ft long, with a ceiling 27.9 ft from the floor covered 5 ft lower by 1x1-in. plastic louvers. To break the huge expanse, the architects worked a pattern into the ceiling with sections of light tan-colored plastic louvers. Above the louvers in Peerless 3-lamp industrial recessed-type fixtures with Corning lens (serviced from above) are 408 40-w fluorescent lamps. Original calculations by Edgar Morgan, electrical engineer associate of James Gayner, consulting engineer, were for 55.2 f-c at the reading tables but color in the louvers increased transmission loss from 10 to 20% and a 35 f-c level is attained. Wood panel walls have lower reflection factor than original figures called for. Similar lighting is employed in the 57x57-ft classrooms with 63 fixtures at a 24-ft mounting height, where 42.8 f-c is delivered. In these the louvers are all white. Walls are a light pastel green. To light the hallways 4x4-ft fixtures with eight 40-w lamps are recessed 6 in. into the ceiling, using the same 1x1-in. plastic louvers. Over the card catalog files shown at left a troffer of five 2-lamp fixtures with plastic louvers is run. Similar units are over the counter and librarian's office. In the book stacks All-Brite slimline single-tube Versalites give distribution of 51 f-c on the top shelf face vertically, 44 f-c the second, 33 f-c the third, 16 the fourth, 9 the bottom. Vincent Electric was contractor.

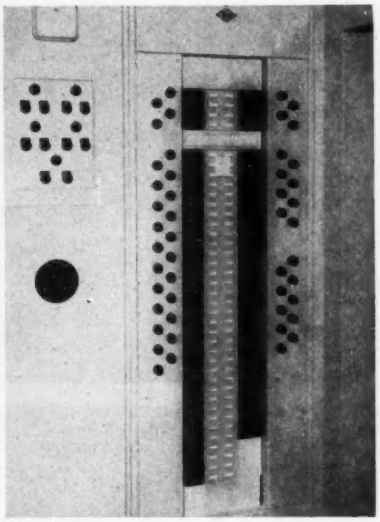
Eyeball units light a stage behind the doors



Gallery walls are bathed from a lens-covered trough lamped with white and daylight



Oriental room lighted by 300-w silver-bowl lamps in 3x3-ft translucent glass panels



Dimmer and pilot lights at control board

LIGHT TO SEE ART

In converting the home of the late Ellen Scripps at La Jolla into that community's Art Center Foster K. Sampson, illuminating engineer, worked with architects Moser & Drew to make the gallery lighting effective but inconspicuous. Along the edge of a dropped ceiling a continuous trough, made by Century Lighting, contains 3x6 in. lenses, behind which are alternate 40-w white and 60-w daylight incandescent lamps. The daylight lamps are on separate circuits. The white lamps are controllable from a dimmer at the main control panel when stage presentations are made, using the gallery for seating. A small stage at one end is concealed behind sliding doors. Three eyeball units in front of it are for front platform lighting and a louverall ceiling lights the remainder of the platform. The Oriental room is lighted by 300-w silver-bowl lamps in the center of 3x3-ft glass panels made by Wagner Woodruff Co., projecting 4⅜ in. below the ceiling and 3¾ above it. Ceiling spots are mounted in ceilings where art objects might be located on the floor. Other outlets with lock-type fittings are conveniently located for possible use of spots or floods. Floor outlets are provided for possible case lighting. At the distribution panel a pilot light is used on each lighting circuit controlled from that point. Near the lighting panel is one for heating and ventilating equipment.

The electrical installation was made by Davies Electric Co. of San Diego.

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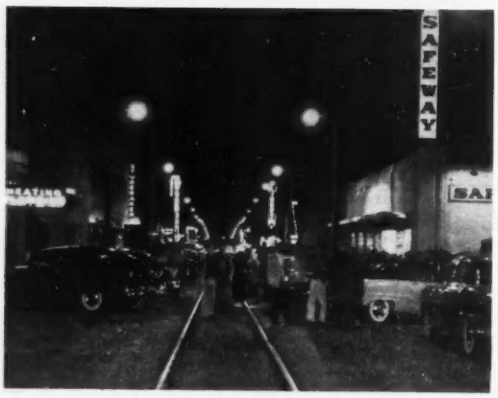


Even distribution shown by 3 a.m. photo, at top; enough light by auto dealers use of street for a new car show. Dedication ceremony at bottom, Chester Jarrett speaking, Johnson and mayor are nearby

Photo-Cell Controls Oregon City Street Light System

When Oregon City's mayor, Albert Roake, commanded "Let there be light," the police department's walkie-talkie relayed his message to a new fire truck, radio equipped, five blocks away. The fire captain turned off a large spotlight trained on the control photoelectric cell on Portland General Electric Co.'s pole. Instantly the darkness was pierced by 80 20,000-lumen mercury-vapor street lights to make Oregon City's Main Street the best lighted for a city of its size on the system.

And after the dedication ceremony 13 automobile dealers used the street for an auto show, displaying new cars.

Main Street is 3,406 ft long, 44 ft curb to curb. Units are mounted 30 ft above street level, 85 ft apart, on opposite sides, with an overhang of two feet from the curb. The main intersection receives 5.1 f-c; average midspan 2 f-c, taken on the standard 10x20-ft grid for the entire 10 blocks, with cosine-corrected meter.

An overhead system was selected, with the provision that each ballast be installed in the base of the pole, with duct work cast into footings for later entry from an underground system. The circuit consists of a photoelectric control pilot wire energizing relays which in turn carry four 20,000-lumen street lights from the local secondary distribution system. A synchronous hour meter measures the accumulated hours of pilot wire operation. The total connected load, 40 kw, is used as a multiplying constant to arrive at kwh readings for billing purposes.

Procedure for the initiation of this installation was as follows: Robert A. Finlayson, city manager, requested PGE to prepare a lighting recommendation. Don Curtis, division manager, dispatched a crew consisting of Perry Landsem, superintendent, Kenny McGraw, estimator, and Chester Jarrett, lighting consultant. A survey of physical characteristics, with dimensions, location of driveways, basement elevators and overhead signs, was made. Specifications with drawings and cost estimates were presented to the city commission. The estimate for multiple overhead ornamental mercury was $32,000. That for series underground was $54,000, both based on 82 lamps.

Oregon City officials and business men were invited to the demonstration street lighting outdoor laboratory in Portland where 1,400 ft of street with installations of various lighting intensities and mounting heights can be shown. By operating unit and group controls on a master panel, 30 different street lighting combinations can be shown to illustrate proper and improper lighting procedures. (See ELECTRICAL WEST, September 1947, p. 69.)

To celebrate the new lighting the Chamber of Commerce organized a program, illustrated here. A 30-minute band concert on the courthouse lawn, color-guard march and presentation of the colors preceeded short talks from Hilbert S. Johnson, general division manager, PGE; Chester W. Jarrett, lighting consultant, who explained the function and value of the new type equipment; and Mayor Roake, whose dedication was climaxed by the electronic relay means of lighting the lamps.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

On the go again

Building began to boom again nearly everywhere in the West in August. In fact it was better in July than a year ago July by 32% more building permits in 270 Western cities and permit valuation was up 43%. Noticeable too on reports of projects to be bid on have been a few private buildings again, not all defense project, government facility or public school or hospital, although the latter still predominate. Release of materials for all but a few types of amusement construction has brought some deferred drawings off the drafting boards. Even the steel situation, still tight after the strike, shows signs of easing.

Steel priorities

NPA said on Aug. 4 that "critically important industrial expansion projects necessary for defense will receive top priority for allotments of steel for the fourth quarter . . . even if this requires deferral of new starts in all other industrial and commercial construction."

Copper loose

Meanwhile CMP-6 and M-100 were amended to increase the amounts of copper and aluminum that can be used in general and residential construction respectively. Only on recreational and amusement construction aluminum is restricted to electrical conductors only, but copper is released up to 5,000 lb on industrial plants, factories and 1,000 lb for stores and farms, etc., under self-authorization. In residential 200 lb can be used for any purpose, and where copper water pipe is used, 400 lb.

On its merits now

Aluminum electrical conductor is made the subject of a special report by the National Electrical Contractors Assn. to its members. The NECA report says that since the urgency to substitute aluminum for copper seems to have been relieved the choice will depend on economics. Aluminum costs less per pound and a pound goes further. But this is sometimes offset by extra labor to overcome some aluminum problems. It concludes that for branch circuit wiring it is not economical. On large cables and bus bar, some service-entrance cable and outside conductors it fits.

Never stable

Contractors' labor problem isn't wages as much as supply of men. The wage situation is stabilized except for Oakland's Local 595, which is going to the Council on Industrial Relations asking to break over the $3 scale by 6c. The council met late in August so the decision was unknown at press time. If Oakland's local gets this, the others are poised to ask for the same, taking advantage of the shortage of men again.

Shifting pockets

Kaiser Engineers' contract negotiated with the Atomic Energy Commission for a big expansion at Hanford has aroused more bitterness than anything in a long time. Having acquired itself an electrical contracting firm, Foothill Electric Co., a former small residential contracting company in Oakland whose proprietor died, Kaiser has converted it into a big operator to do the electrical on its big projects on negotiated contracts. Other contractors, both general and electrical, as well as the unions, are aboil over the subterfuge arrangment. The roar they are making may be loud enough to reach the ears of next Congress.

Freedom to work

Preferential hiring, the backbone of closed-shop contracts between unions and employers, is illegal under the Taft-Hartley law and the National Labor Relations Board recently got tough with a large building contractor on an AEC project and ordered him and the union to stop it. The ruling puts all such hiring through the union in question, an old and a practical method of getting men for the construction industry. It may go on until challenged by someone who applies for a job, is refused clearance by the union, and who calls for the T-H law to be enforced.

Still under

Construction industry enterprises are not exempt from the new WSB wage and salary controls even if they employ less than eight persons.

Even for fancy

Copper can also be used in decorative lighting fixtures. It was prohibited for such use up until July 18. The copper is still on allocation to the manufacturer but no limitation is put on what it is to be used for. Previously only current-carrying parts could employ copper.

Wire differences

Wire carrying capacity and insulation will be the subject of two meetings whose purpose will be to seek unanimity of opinion and to close the gap of interpretation between the California State Safety Orders and the National Electrical Code. It will be co-sponsored by the PCEA, Western Oil & Gas Assn., California Manufacturers Assn., IBEW, municipal inspectors and others and has the blessing of the California Division of Industrial Safety. The Los Angeles meeting will be on Dec. 3, the San Francisco on Dec. 9. The record of experience with various wire insulations under different carrying capacity conditions will be reviewed. There will be visual demonstrations and a panel of some of the nation's top experts to answer questions. These are E. W. Davis, director of engineering, Simplex Wire & Cable Co.; Robert J. Wiseman, chief engineer, the Okonite Co.; R. A. Schatzel, vice-president and director of engineering, Rome Cable Corp.; and L. F. Hickernell, chief engineer, Anaconda Wire & Cable Co.

Legal block

Main difficulty in reconciling the Safety Orders and NECode is legal, not logical. California law makes any changes in its Safety Orders retroactive, whereas local ordinances based on the National Electrical Code let sleeping "dogs" lie until they act up. Change of the wire tables to Code capacities could be enforced to require rewiring of all existing installations in places of employment to meet the new standards—at a cost that would break many businesses, whereas the existing wiring is functioning all right unless disturbed. What is needed is a change in the safety law.

New manager

Joe Bollinger was appointed manager of the San Diego Chapter of NECA to start Sept. 1, succeeding Pete Montgomery. Bollinger, an electrical contractor in Coronado, will close that business. He has been an active member of the chapter for the past seven years.

Appointees

Sterling Electric Motors Inc. has appointed Woodbury & Co., at 133 S. W. Second Ave., Portland, as a distributor; and in Klamath Falls, Cascade Industrial Supply Inc., 515 Market St.

A leader

Robert Bartlett, one of Salt Lake City's old-time contractors, died suddenly in August. He had two sons in the business who carry on.

Fixture styles

Lightolier has just issued a handsome new stylebook of residential lighting fixtures to serve both as a reference book and selling device. Each of the 258 styles shown are well illustrated and sketches show where they are appropriate. Decorative ideas, data about the designers, details about the fixtures are included in the 9x12-in. booklet, copies of which are obtainable only from the electrical distributors.

Revamped list

Dun & Bradstreet Inc. has redesigned and restyled its Reference Book after two years of work on it. It replaced 30 previously used trade symbols with U.S. Standard Industrial Classifications; uses "A" for new listings of businesses; "C" to indicate a change; a year figure to tell when the business started and symbols to indicate estimated yearly sales. Electrical listings follow the SIC numbers now.

Absorbed

E-Z Way Tool Co. of Chicago, maker of an electric hack saw, has been bought by Burpee Can Sealer Co. of Barrington, Ill., which has moved plant and offices to its Barrington headquarters.

Farm talks

National Farm Electrification Conference will be held Oct. 20-21 at the Statler in Detroit. It will have a different format—section sessions to discuss practical applications—as well as general meetings.

Fluorescent mercury

Honolulu, Hawaii, now has a 1/3 -mile downtown section lighted by the new fluorescent mercury lamps by Westinghouse, producing three times the light as the incandescent lamps they replaced and with a lamp life rated as five times as long. The fluorescent coating in the mercury lamp gives off a color similar to that of incandescent. The units are mounted 30 ft from the street in football-shaped fixtures.

To reach builders

To stimulate builder interest in electrical features for homes the Better Homes Bureau of Westinghouse, P. O. Box 868, Pittsburgh 30, Pa., has available several fine promotion pieces. These include a Design Manual, with which to design kitchens, laundries, lighting and wiring, and Design Details, which contains scale drawings for architects and designers. Also there is Planning the Kitchen Electrically and the Home Wiring Handbook. For electrical contractors the Home Wiring Estimator is a great time saver and business builder. To reach the consumers Westinghouse has a full line of movies, booklets, etc.

Socialism is here

When the state itself becomes the biggest electrical contractor in the state it is high time the private electrical contractors take note. At the California Conference of NECA Chapters meeting in San Francisco, Aug. 23, the problem received a lot of discussion and Chairman R. Goold of Stockton was asked to set up a state-wide committee to take action.

Nominated veeps

Ed Buttner, Oakland contractor, who has been labor relations committeeman for District 6, NECA, was endorsed by the conference for vice-president for the district. E. B. DeFeyter of Spokane who had been spoken of for both vice-president and labor relations committeeman, the way it is represented in other districts, withdrew from the nomination for vice-president but remains a candidate for the labor relations post. In District 8, Ralph Johnson of Denver will not run again for both posts for that district. At the recent District 8 meeting Charles Simpson of Cheyenne was endorsed by all chapters. The election takes place at the NECA convention at Morrison Hotel, Chicago, Oct. 7-9.

Explosive case

Four-hour hearing was given by the Council on Industrial Relations of the Electrical Contracting Industry on Aug. 29 in Washington to the case submitted by Northern California Chapter, NECA, and IBEW Local 595, and the council went into executive session for two hours afterward. Top brass sat on the council, for Dan Tracy was on the union side, Paul Geary the contractors. The decision will not be made known until mid-September. It is highly important on two points. First is whether a 6c an hour increase to the union can be granted without throwing all the wage scales in California in for another boost. Second is the issue of powder-actuated tools which that local wants to boycott. Both questions are "loaded."

Figuring know-how

Estimating courses are being signed up for in surprisingly good numbers in both the Northern California and the San Francisco Chapters of NECA. The San Francisco association's officers were surprised to have 42 sign up and put up the check for the course in advance, even though no effort was made to sell it. In Oakland the course starts at the Merritt Business School on Sept. 30, for 34 Tuesday evenings, over two semesters. Henry M. Tilson, engineer, will be instructor. San Francisco's instructor and school have not yet been selected. A course is being signed for in Sacramento also.

Helper needed

Utah-Idaho Chapter of NECA is looking for a good man as assistant manager for the chapter to assist G. A. Howarth, manager, who is still recuperating from an illness. At a special meeting Aug. 25 this course was decided upon by the group in Salt Lake City following a recommendation from Idaho members at an earlier meeting.

Savings plan

Piggie banks, with a wire-nut pigtail, and a slogan, "Fatten me for '53," are being sent all members of the International Association of Electrical Inspectors as a suggestion that they save up to go to Chicago next year for the joint convention of all sections as IAEI's Silver Jubilee. Ideal Industries Inc. is donating the pigs and a contest has been concocted for prizes for the best dressed pig.

Like a stage

Extreme versatility for dramatic lighting of display windows has been achieved in a New York store by use of Unistrut framing inside the window and Bulldog Trol-E-Duct for conductors. To the Unistrut frame of steel channels and connecting fittings, like an Erector set, any combination of spot and beam projectors, reflectors or lampholders may be mounted and fed by plugging in to the trolley duct. It makes a versatile stage of the window for the display man to work with.

No more pennies

A miniature circuit breaker that fits a standard plug fuseholder, called a Mini-Breaker, for use on 110-125-v circuits instead of fuses, is in production enough for national distribution, made by Mechanical Products Inc., 1824 River St., Jackson, Mich. It passes UL tests and is listed as a "circuit breaker-miscellaneous," has a time lag to handle temporary starting loads and surges, is reset by pressing a button. Can also be used on electrically operated machines and appliances. Comes in 15-, 20- and 30-amp ratings.

Concentrated

Arrow-Hart & Hegeman Electric Co. features its compact across-the-line magnetic motor starters with half the size and weight of ordinary starters and a straight-through wiring arrangement, in its new catalog now offered contractors.

Tracers

To identify wires or conduits, particularly since colored wire jackets have been hard to obtain under wire manufacturing restrictions, the Western Lithograph Co. of 600 E. 2nd St., Los Angeles, makes self-adhesive identifying stickers that it calls E-Z Code Markers, in NEMA color standards and numbered and in a variety of combinations.

For the independents

A home-study course for electrical contractors in estimating is now available from International Correspondence Schools, either for individual study or to employers for key personnel. It uses as textbook the Ray Ashley book, "Electrical Estimating," and includes 36 lessons.

Keep telling the public

A lighting program is next on the list of promotions being put on by the contractors division of San Diego Bureau of Home Appliances. Al Myers and his lighting committee are preparing the material for TV programs and for a contest among customers, to start in October. Air conditioning was featured in advertising and TV last month. Another educational-informational program is being developed to take the contractors' story before the luncheon clubs of the area.

IES briefs

Charles Long, lighting engineer of Westinghouse Lamp Division in Los Angeles, has been appointed to fill out the unexpired term of Leonard Hobbs as a director on the board of Illuminating Engineering Society. Hobbs was elected regional vice-president . . . Other IES news is that the Northern California Section won first prize, the Southern California Section second prize in the national contest among sections for new membership during the past fiscal year.

Tangible benefit

A home-rewiring campaign, based on Plug-in Strip is being tested out in Erie, Pa., sponsored by utility, distributors, contractors and inspectors. Newspaper, radio and TV ads warn people of octopus wiring and stress the convenience of outlets every 18 in. It is stirring up business for contractors and electricians.

Unbalanced budget

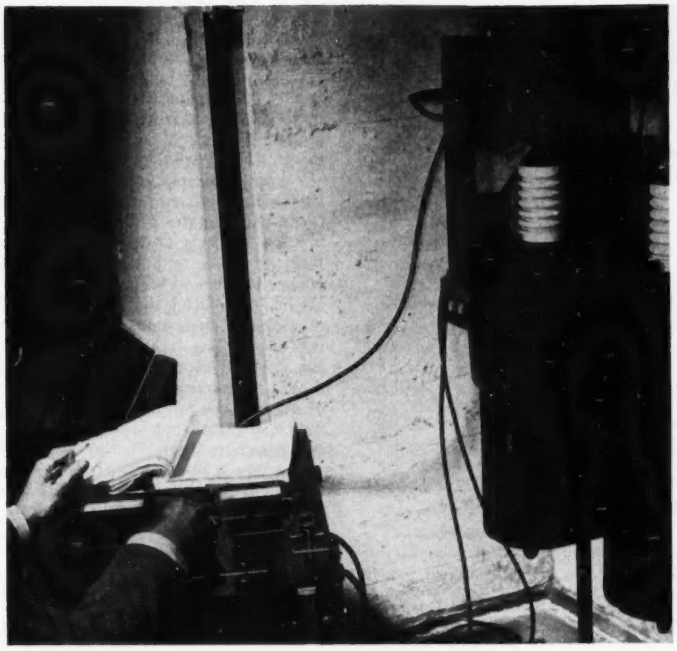
More money is needed to balance the cost of the pension plan in the electrical workers union. This was stressed by J. Scott Milne, IBEW secretary, and by Lawrence W. Davis, executive secretary of the National Electrical Benefit Fund, at the recent Progress meeting of the 9th district of IBEW in San Francisco. It takes $4.52 per month per electrical worker to support the pensioners. The members each pay $1.60 a month; this is matched by the contractors, a total of $3.20. By lengthening the requirements for pension Milne estimates some 70c is saved but 62c is still needed. Better collections from contractors were demanded, only 8,600 of 11,528 who employ union electricians now paying. Public member of the board, Dr. E. E. Witte of Madison, Wis., also addressed the group on harmony and cooperation.

By-products

San Francisco Electrical Contractors Assn.'s public relations committee, working on suggested changes to the city code, is developing some further simplification for current coil and bulkhead enclosures about which more will be heard later. It is also asking that the recent temporary pole standards issued by the Public Utility Commission be amended to allow the use of available materials, such as TW wire instead of rubber covered and electric metalic tubing instead of conduit—materials that the house wiring contractor normally has on hand.

Meeting a trend

Underwriters' standards have recently been revised as to electric ranges, aluminum conductors, aluminum lamp sockets and fuseholders, and fuses.



This set to determine the condition of machine insulation brings large savings as—

D-C High Pot Test Eliminates Dry-Out Time

A new method of testing the electrical insulation of generators and synchronous condensers (ELECTRICAL WEST, May 1952, p 79) enables a quick and reliable diagnosis of the condition of the winding to be made to determine when the machine can be placed on the line after a rewind job or after the final assembly of a new generator. This new method was originated and developed by G. Leslie Hill of the department of engineering of the Pacific Gas and Electric Co. It has been under experimental observation for several years and the technique has now reached a stage where it has been adopted as the primary means of testing and determining the condition of the electrical insulation of all the large rotating machinery on the PG and E system.

For the past four years the d-c high-voltage method has been the only test used. It is the sole criterion upon which management makes decisions to rewind or repair, and when to put a machine on the line after a rewind. Sometimes $100,000 is involved in these decisions and the reliability of the test method is all-important.

In the past it has been the general practice to place a generator or synchronous condenser on a dry-out run before placing it in service. The time required for the dry-out run has varied with the size and condition of the machine but has averaged about eight or ten days. In some cases a longer time was needed.

The usual practice has been to place the machine on dry out and take readings of the megohms resistance of the insulation periodically, and decide when the machine is dried out by observing the trend of the readings. These readings were generally taken with a 500- or 1,000-v hand-driven insulation tester reading in megohms, or a 500-v electronic insulation tester that has been developed recently.

The megohm readings were taken at such a low d-c voltage, when compared with the a-c rating of the machines, that no one had the courage to place the machine on the line until the megohm-time curve had completely flattened out and had reached a certain maximum value for a period of time.

Large Savings

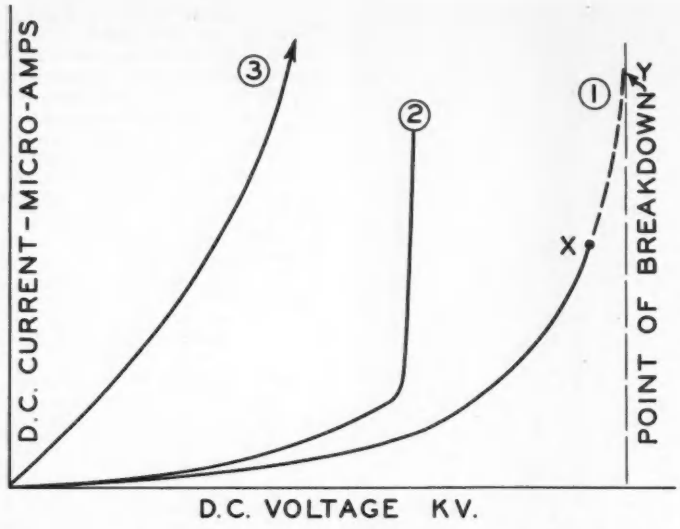
E. A. Crellin, general superintendent of hydroelectric plants for PG and E, reports that by using the new technique for determining the condition of the insulation his company has been putting old generators on the line without a dry-out run after a rewind job; also new generators after final assembly. It has been possible also to eliminate the usual a-c high-potential tests of two times rated a-c voltage plus 1,000 v on new rotating machinery after final assembly.

The economic gain as pointed out by Crellin can be realized quickly when some of the recent rewind jobs and new generators that were put on the line without dry out are considered for analysis. Seven machines, totaling 121,095 kva, were rewound in six plants and put in service without dry out. Seven new machines, totaling 266,000 kva in five plants were likewise put in service without dry out.

In the cases of Bucks Creek, Big Bend, Cresta and Rock Creek, four of these jobs, water was available in continuous flow, and nearly full capacity of the generator would have been lost during a dry-out period. Consider water by-passing a 25,000-kva generator that would supply at least 75% full load for the 24-hour period. The loss at 3 mills per kwh would then be between $1,000 and $1,500 per day. An unnecessary 10-day dry-out run would entail a total loss of $10,000 to $15,000, an economic factor of considerable importance.

Dry Out Not Needed

One set of coils for Bucks Creek generator 2 had become damp because of a leak in the roof of the warehouse where the coils were stored. It was determined by high voltage d-c tests, however, that the machine could be put on the line without a dry out after the rewind was completed. The No. 5 generator at Big Bend was re-



Curve 1: Solid homogeneous dry insulation. Test can be stopped at point X, extrapolate curve to point Y, and obtain predicted dielectric strength without puncture

Curve 2: Faulty insulation due to dirt and oil, aging, corona, mechanical damage or tap separation—test is stopped when "knee" is observed, to avoid puncture in winding.

Curve 3: Insulation in wet condition—current rises more rapidly with applied volts

Fig. 1: These are typical curves obtained in testing insulation with high voltage d-c

wound with class A insulation and tests showed that the winding was satisfactory to place on the line without a dry-out period. These coils were stored in the damp basement for about a year before installation.

The new method of insulation testing requires a source of high voltage d-c up to about 40 kv. There was no light portable apparatus available when Hill first started his experiments and it was necessary to pioneer and build the equipment. The testing sets, as completed, weigh about 90 lb and the carrying case is about the size of a big 3-suiter piece of luggage.

The fundamentals of this new test method are to take readings of microamperes, for small increasing increments of d-c voltage, and to plot a curve while the test is in progress with current as the Y ordinate and voltage as the X ordinate. The maximum d-c voltage to apply is decided upon before the test starts but if a sudden increase of current or a knee in the curve is observed the test is discontinued and steps taken to determine the cause. The basic requirement of this method is to await a stabilized reading of microamperes at each value of applied d-c voltage. Having determined the ratio (1.7) of d-c to a-c breakdown voltage, it is possible to predict quite accurately from the d-c test at what voltage a-c breakdown will occur.

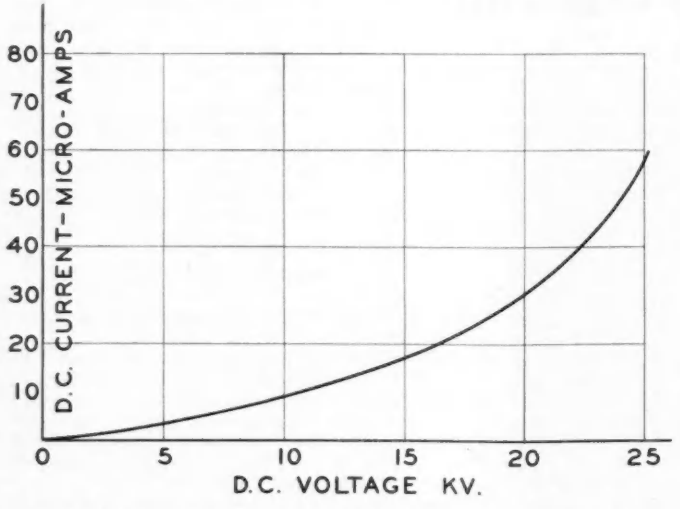


Fig. 2: Curve obtained after rewind of generator No. 5 Big Bend power house—no dry out

Interpretation of Curves

Fig. 1 shows the typical types of curves obtained during tests on the insulation of over 3,000,000 kva of rotating machines on the PG and E system. Curve 1 is the characteristic shape obtained when testing new as well as old insulation when in good homogeneous physical condition and with a moisture content that would be classed as dry. Curve 2 is the type obtained when testing faulty insulation that has deteriorated because of dirt and oil, aging, corona, mechanical damage or tape separation. The current will increase uniformly with the increase in applied d-c voltage but at some value it will form a knee in the curve. Any additional increase in the d-c voltage will cause a puncture in the winding. The test is stopped at this point and steps taken to determine the cause. Curve 3 is the type generally obtained when the insulation is wet. The current rises more rapidly than it should under normal conditions and may reach a value of several milliamperes without puncturing the insulation. This type of curve was obtained on a machine that had water poured into the winding to put out a fire after a short circuit. Obviously a dry out is required in a case of this kind.

Fig. 2 is a curve obtained on the Big Bend generator No. 5 rated at 12,500 kva, 11,500 v. This was after the rewind job with class A insulation and dry out. The d-c voltage was gradually increased to 25 kv and at this point the d-c current was only 60 microamperes. Upon analysis of the shape of the curve and the value

of current obtained it was decided to put the machine on the line without a drying-out period. This was done; no trouble developed and the generator is still running satisfactorily.

The curve obtained on Big Bend generator No. 5 is similar to the curves on the other generators and synchronous condensers that were placed on the line without dry out. It is thought that this is the first case of a large generator rewound with class A insulation that has been put on the line without a dry-out run.

The method as outlined here was presented by Hill at the June 1952 summer general meeting of the American Institute of Electrical Engineers at Minneapolis, Minn., and was enthusiastically received. It was brought out at the meeting that the method has been most extensively used on stator insulation of large rotating machinery, but that it has been applied also to bushings, cables and transformers with equal success.

Transformer Tests

Fig. 3 shows a test assembly made on three 10,000-kva 110/66/12/6.6-kv transformers at the San Leandro station U of PG and E. It will be noted that A- and B-phase transformers had very uniform curves up to 25 kv d-c with a maximum reading of 12 microamperes passing through the insulation between the 6,600-v tertiary and the grounded high-voltage winding, whereas C-phase transformer had 210 microamperes at 20 kv d-c. Examination of the C-phase transformer showed a leak in the piping system allowing moisture or water to enter the transformer.

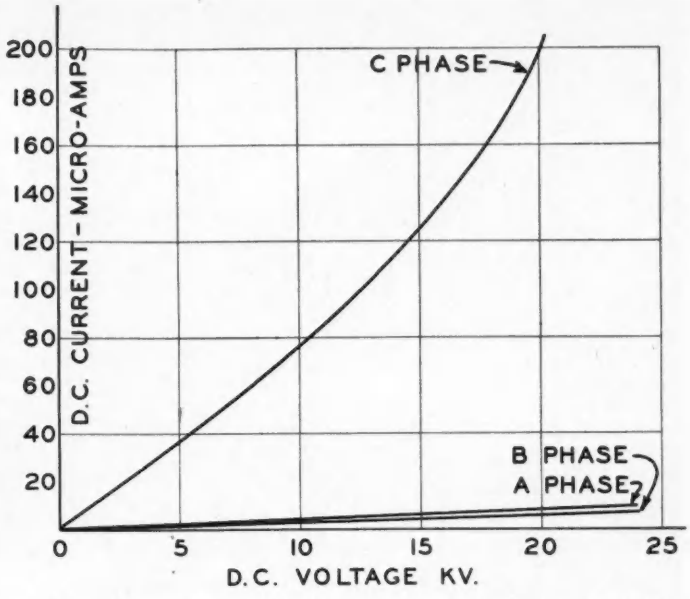
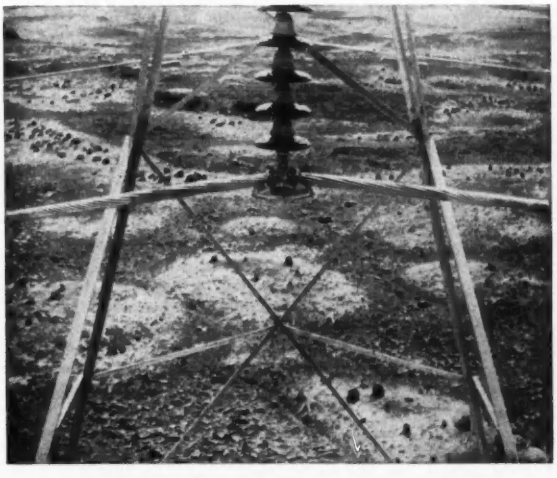


Fig. 3: Insulation test on three 10,000-kva transformers 112,500/66,000/7,380/6,600 v

It should be noted that a reading taken by a 1,000-v hand-driven insulation tester gave a reading of 50 megohms on the C-phase transformer, which normally would be considered satisfactory, whereas there was no question that something was wrong with the C-phase transformer when the curves of Fig. 3 were analyzed.

Summarizing, Pacific Gas and Electric Co. engineers state that experience and test results to date lead to the conclusion that the best and most reliable method to determine the condition of the insulation on large rotating machines is by observing the characteristic of the d-c microamperes to d-c voltage curves on the insulation of the machine under test.

They have concluded also from experience that the a-c high-voltage overpotential tests previously used are an unsatisfactory criterion of insulation condition and, moreover, that such tests may damage the insulation without the test engineer's knowledge.



Corona-Free Clamp

A new type of transmission suspension clamp designed to be corona-free on 230- and higher-voltage lines has been used by the Bonneville Power Administration on several of its recent lines. The clamp, shown at left, was designed by Boeing engineers as the result of their long-standing interest in the problem of radio interference and is now manufactured by the Boeing Airplane Co. of Seattle. It is of special design, made of cast aluminum with completely shielded nuts on the U-bolt. Tests made at Oregon State College and Stanford University are said to have shown very low corona discharge, radio noise and magnetic loss at line voltages from 230 to 500 kv. The Bonneville Power Administration is using the clamp, on a competitive basis, on its The Dalles-Maupin-Madras 230-kv line, its Columbia-Grand Coulee line No. 4 designed for operation at 300 kv, and others. The photograph shows an installation on the Columbia-Grand Coulee line.

Washington Water Power proposed to build a hydro plant on placid and innocent-looking Clark Fork River in 21 months. It was...

The Job That Couldn't Be Done — But Was

Clem Stearns
Washington Water Power Co.
Spokane, Wash.

Another challenge, one of the most dangerous and exacting in the annals of hydroelectric development in the Pacific Northwest, has been met successfully by a private utility. In September, just 21 months after start of construction, the Washington Water Power Co. will be operating the first of four 50,000-kw generators at its new Cabinet Gorge plant on the Clark Fork River in northern Idaho. The spectacular job is being financed by private investment of some $45 million and is Idaho's largest hydroelectric development.

There were some who said the job couldn't be done. Not only was it started at a time when the outcome of the WWP ownership dispute was uncertain but also the dangerously rugged gorge in which the dam was to be located—a narrow, Z-shaped canyon where the river flowed 95 ft deep between vertical walls rising over 350 ft—was said to present diversion and construction problems impossible of solution in the one short season allowed between runoff periods.

But with a drafting room set up at the project itself and a working model in the background, Ebasco Services Inc. tackled the job and cut the pattern to fit the cloth. Teaming up with WWP and Ebasco were the men and machines of Morrison-Knudsen Co. Inc. The job went forward 24 hours a day through all kinds of weather to reach the goal—delivering new kilowatts to power-hungry Northwest—well ahead of any other private or public project in the area.

Permission to build the 200,000-kw plant was granted WWP by the Federal Power Commission in early January 1951, the application having been held but two months, one of the quickest approvals on record. Then the State of Montana cleared the last legal obstacle when it passed legislation permitting storage of water in that state.

While access roads were being gouged in the rough terrain and materials for preliminary construction were being moved in, WWP line crews and electric contractors bucked heavy winter snows to rush erection of a 34-mile, 110-kv construction power line from Sandpoint to the dam site.

Access Difficult

A difficult feature of the project was the lack of feasible sites for haul roads and, to begin with, men and equipment had to be transported to various phases of the project by catwalk, skips handled by cranes, highlines and suspension bridges. Altogether some 782,000 cu yd of excavation were necessary in the area, an unusually high ratio, against a total of 236,000 cu yd of concrete in the overall project.

Cabinet Gorge is located about one-half mile west of the Montana-Idaho state line. The dam is a variable-radius concrete arch structure 208 ft high

from the lowest point of bedrock to the top of 40-ft-high, lift-type spill gates capable of passing 256,000 cu ft of water a second. The structure is 44 ft wide at the base and 35 ft wide at the top. The south abutment is split into a thrust block to carry arch stresses and a cutoff wall to shut off the water on that bank.

Six hundred feet in length, it will impound water to a depth of 110 ft (2,175 ft elevation) above former water surface with 43,000 acre-ft of usable storage. The reservoir of 32,000 acres extends 24 miles upstream to Noxon Rapids, Mont. About 9½ miles of Northern Pacific main line and 11½ miles of highway and county roads were relocated.

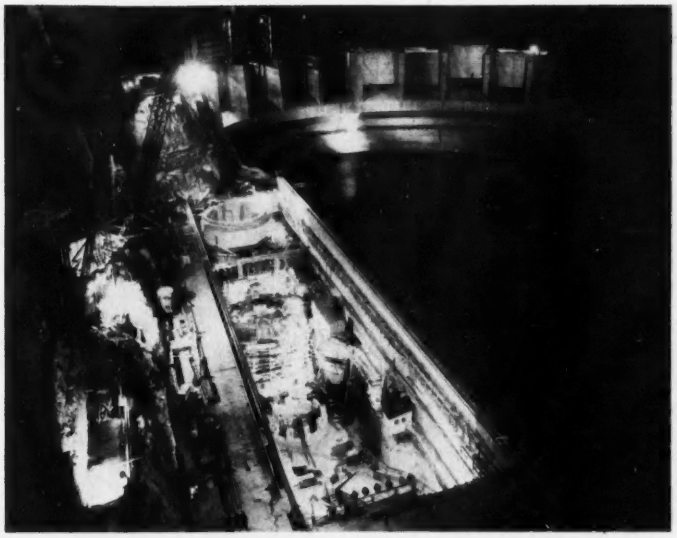
Diversion Most Difficult

The job of diverting the turbulent Clark Fork River (mean annual flow of 18,410 cfs) was considered the most difficult ever encountered in North America. Twin bores 1,000 ft long and 29 ft in diameter were driven through solid rock of the peninsula formed by the Z-bend of the river to handle 40,000 cfs. An innovation of cofferdam construction took place in August 1951, when 63,000 lb of high explosives ripped some 70,000 cu yd of rock from a 200-ft canyon wall to bridle the river. An intricate plan had been devised to reduce flow of the river to a minimum, with upstream plants of Montana Power Co. having shut down on a tight schedule in the preceding 48 hours. It was a gamble around which the whole diversion problem hinged but, as did others taken earlier, and later, in the project in the compelling interest of time and cost, it worked.

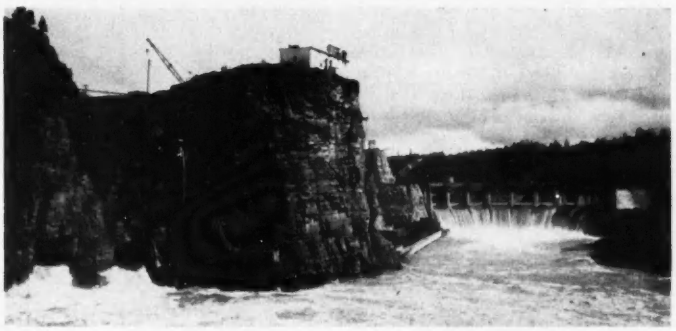
The shot served to turn the river flow into the diversion tunnels until an additional upstream cofferdam and another downstream barrier could be thrown across the channel. With more than 300,000 cu ft of fill in the river, dewatering was still a real problem and pump capacity at one time was stepped up to 130,000 gpm to handle the situation.

Concrete Pouring

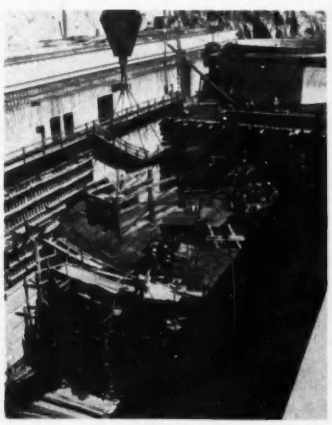
Concrete pouring started in November with mixtures for the dam (123,500 cu yd) being drifted into place from a single cableway with stationary head and tail towers, and power house concrete (68,000 cu yd) being delivered by a stiffleg derrick, one of the two largest in the world with its 200-ft boom. Pouring continued throughout the winter with aggregate mixtures being preheated by steampipes,



Around-the-clock work was necessary to meet 21-month schedule on Cabinet Gorge plant



Building Cabinet Gorge Dam was a race with time to win over flood of Clark Fork River



Setting scroll case (left). Right: Concrete barrel pouring could not wait for flooring

and by salamanders and pots during pouring.

Another important deadline was met when the dam was up to the sill of its spill gates by early April this year, accommodating the spring run-off that peaked at 81,000 cfs May 21, somewhat under the usual annual flood. Also, draft tube gates had been installed and the outer wall of the power house taken up ahead of schedule to protect preliminary work that had to continue uninterrupted at that site.

Penstock tunnels are 450 ft long and 27 ft in diameter on a 17 degree incline. They had been bored from the intake end to prevent interference with start of construction in the power house. Included in a long list of other field expedients to save precious time were the placing of scroll case concrete in a few days instead of the normal period of several weeks and the taking up of the generator barrel without floors in order to speed erection of the unit.

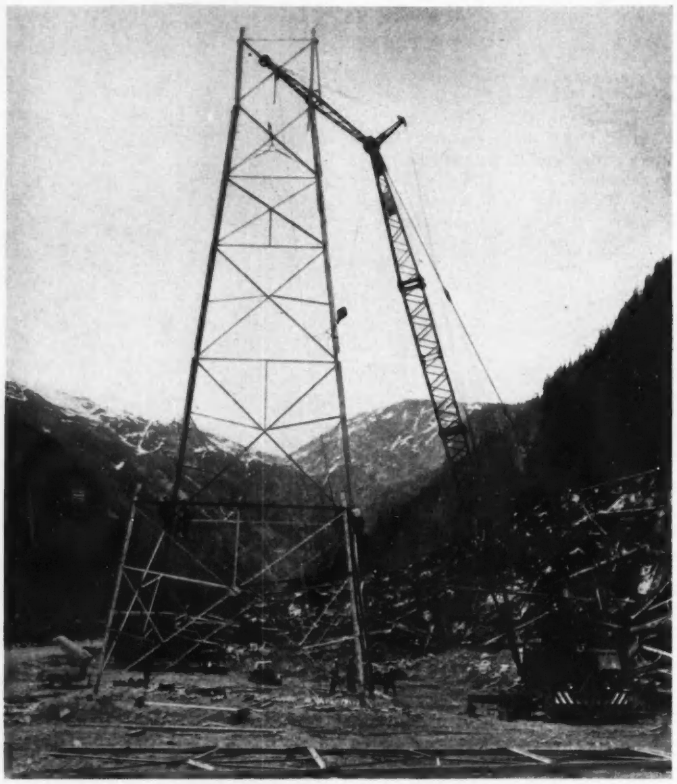
Generators—Turbines

The four 50,000-kw vertical, semi-outdoor-type Westinghouse generators will be driven by 70,500-hp Kaplan-type Baldwin turbines, three of fixed-blade type and one of adjustable-blade type. A 275-ton crane above the power house structure was provided. Upstream regulation will keep a relatively constant operating head of 100 ft on the plant.

A bank of three single-phase 42,500-kva transformers, 13.2/230 kv, was provided for each pair of generators. Vertical risers will be anchored directly to the transformers and linked over incline towers at the edge of the switchyard above the power plant. A pair of 3-phase, 125,000-kva, 230/115-kv autotransformers will be located at the terminal end of the Cabinet transmission line in Beacon substation in Spokane. Among the largest ever built, they weigh 228 tons each. They will permit tap changing under load and are forced-air, forced-oil cooled.

After installation of the first unit this September, the second and third generators are scheduled for production at month intervals and the last unit should be on the line in early 1953.

The building of Cabinet Gorge under such adverse circumstances proves without doubt that business-managed utilities can do the job as efficiently and as quickly as federal bureaus, without expenditure of tax dollars. It is the answer for those who choose that free enterprise and the American way of life should be continued.



Steel tower erection is diligently pursued during summer months to escape winter months

Largest ACSR Conductor

Construction is under way on a most unusual 300-kv transmission line that will transmit power 50 miles over rugged mountain terrain from the Kemano power house to an aluminum reduction plant at Kitimat on the Alcan project in the wilds of British Columbia. For a general description of this immense project by the Aluminum Co. of Canada, see ELECTRICAL WEST for December 1951, p 70. The accompanying photographs taken in mid-July by a McGraw-Hill editor show interesting features.

At top of page 97 is shown a portion of the 10-mile Kildala pass section where two lines, one with aluminum towers, will support the 3,364,000 cir mil, 2.295 in. diameter ACSR cable. Ultimate electrical loading on these two lines will be 1,700,000 kw or 850,000 kw per circuit.

The photograph above shows a double-circuit steel tower being erected at lower elevation in the first 10-mile section from the power house. The last 30 miles of line between the pass and the smelter at Kitimat will be of similar construction.

The lower picture on page 97 shows a helicopter of the type that will be used on the pass section of the line transporting a load of lumber for tunnel construction. At lower left is a cross section of the ACSR conductor.

The pass section of the line is the one of particular interest because of the rugged 5,300-ft-high terrain. To and through this section an extremely difficult access road has been chopped out of the steep rock bluffs with grades generally near 20%. Much of the material will be carried in to tower locations by helicopter. Pay

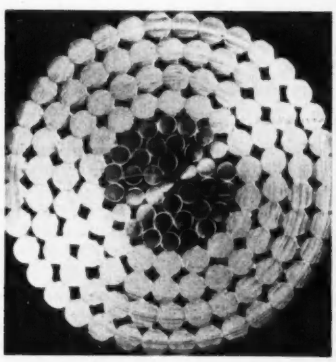
load of the Sikorsky S-55 helicopter to be used is 1,400 lb. Construction will have to be confined to the summer months only, as snow lies deep in that area until late July.

One of the two single-circuit lines across Kildala pass will be built with steel towers, of generally conventional design. The suspension, light angle towers will weigh about 33 tons each; the heavy angle-strain type will be substantially heavier, depending on height. The other single-circuit line across Kildala pass will be built with aluminum towers, using a design of which a prototype has been successfully built and thoroughly tested. This design is a braced frame-type tower with five thin-walled aluminum tubes about 38 in. in diameter and a box-girder crossarm. These towers will weigh about 10 tons each and are expected to show substantial economies in transportation, erection and maintenance.

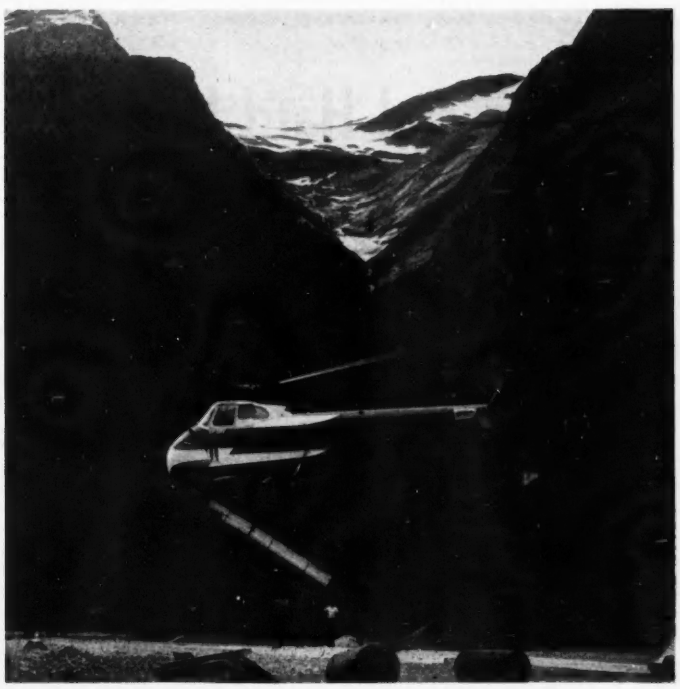
The line in this section will be subject to heavy icing conditions and a high wind load. Basic conditions determining load and load combinations for towers have been taken as: ice load of 40 lb per ft of conductor length at O F as a yield point; 2.5 in. radial ice deposit on the conductor; 2 in. radial deposit of rime on the conductor combined with wind of 8 lb per sq ft; and ¾ in. radial deposit of ice combined with broken conductor action.

The conductor alone weighs 4.77 lb per ft and ultimate strength is 135,700 lb. Diameter and cross section were previously given. This is the largest stranded electrical cable ever fabricated for an overhead transmission line. For the other two sections of the line where two double-circuit steel-tower lines will be used, the conductor will be the standard Falcon 1,590,000 cir mil, 1.545 in. ACSR.

High in Kildala pass these promontories will support towers, one steel and one aluminum



Actual size, 2.295 in. diameter ACSR cable



Helicopter will be chief means of transporting transmission line material in high pass

Experience has convinced linemen, groundmen and Department of Water & Power that . . .

Goggles and Hard Hats Cut Line Work Hazards

H. H. Cox

Assistant Electrical Engineer
In Charge of Operation
Los Angeles Department of Water & Power

A study of eye accidents among the line crews of the Los Angeles Department of Water & Power indicated many accidents in which particles of dust or other falling material had gotten into the eyes of the line helpers. This group is particularly vulnerable to this type of accident because their normal working position is always below that of linemen on the pole. It was obvious that a high percentage of these eye accidents could be prevented by the use of safety goggles. A line of such goggles* was found on the market that was fabricated entirely of plastic materials, was light in weight and strong, and that could if necessary be worn over a workman's regular glasses.

A sample order of these with a clear plastic lens was distributed among the workmen and the answer quickly came back that a tinted lens would be necessary if we were to sell the use of goggles among this group of men. A second sample order of goggles with green tinted plastic lenses met ready approval, particularly after the attention of the men was called to the large number of eye accidents in their group. On the basis of the acceptance of the tinted lenses, a sufficient number of goggles was ordered to equip all of the line helpers and linemen throughout the system.

These goggles have been distributed and are now being used generally by the group, even though their use was not made compulsory. Already they have definitely saved the eyesight of one workman from a flash. It is the feeling of the supervisors of this group that this one case alone has saved the price of the entire order of goggles. Three months after receipt of this order of goggles, it is estimated that more than 75% of the linemen and line helpers are using them. Eye accidents have fallen to a minimum and those that have occurred were to men who were not using goggles.

An interesting side development of the goggle idea came when a group of street light lamp changers who work at night requested an order of goggles with clear lenses after one of their group had gotten dust in his eyes from the top of a street light fixture. Use of the goggles with clear lenses is also encouraged but is not compulsory among the laborers and conduitmen engaged in constructing underground conduit systems.

Wearing of Hard Hats Encouraged

For many years the department has realized the danger of falling objects, particularly to line helpers and to underground conduitmen working in the ditches. Hard hats had been available to these men but were not receiving much use. Recently a campaign of encouragement was undertaken through the facilities of the safety division. These hats are now being used more generally among the underground conduit forces and to some extent among line helpers.

A study of head injuries among line crews similar to that on eye injuries mentioned above was made. With this study as a basis, a campaign for the use of hard hats among line helpers was undertaken. Additional supplies of these hats were made available and they are now receiving considerable use. The line helpers and underground conduit workers seem to prefer the shallow crown metal hats, these being lighter in weight than the plastic hats.

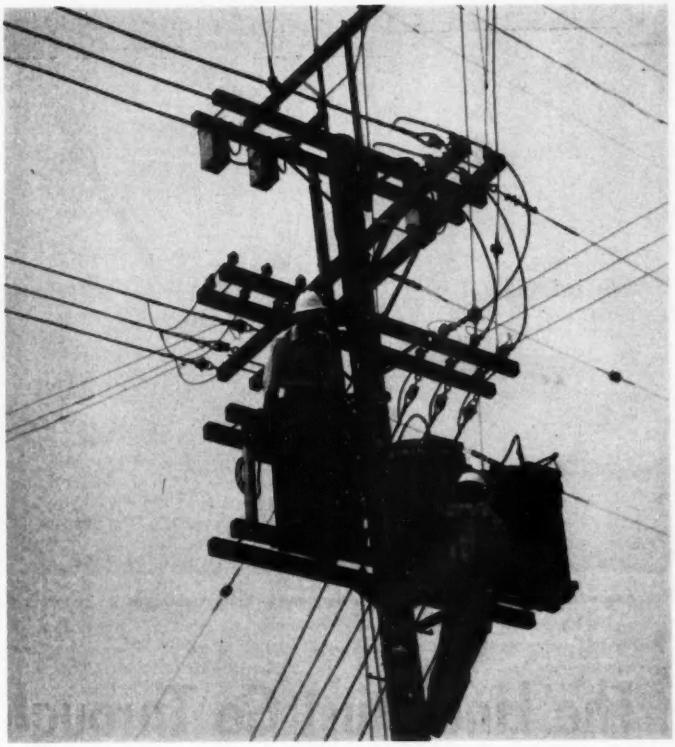
New High-Test Hat

There has recently come on the market a hard hat* designed specifically for the use of electrical men. This hat is made of a Fiberglas mat

* Editor's note: Goggles were furnished by the American Optical Co.; hard hat is made by E. D. Bullard Co.

impregnated with a plastic resin. There are no holes through the shell as there are in most of the hats previously available and there are no metal rivets extending through the shell. Samples of this hat were obtained and submitted to the overhead line force supervisors who showed considerable interest. Samples were tested for electrical breakdown and it was found that it was practical to specify a hat with a breakdown of not less than 10,000 v. This to a lineman approximates the test that is required of his rubber gloves and should give him a feeling of confidence that the hat will offer real electrical protection to his head.

As a distinguishing feature indicating that the hat was designed for electrical workers it was suggested, and the manufacturer agreed, to mark the hats with a distinctive mark — the lightning flash. Specifications were drawn, as here briefed, indicating the requirements the department desired in these hats and a trial order has been placed. The hats when received will be distributed to all overhead and underground districts and the linemen and cable splicers will be encouraged to use them. It is felt that this method of approach will gain acceptance of the high dielectric hard hat and that a considerably greater degree of safety will result. It is expected also that the new insulated hard hat will receive ready acceptance by substation workers and electrical mechanics.



Linemen working on typical poles such as this are protected against head shock from accidental contact with high-voltage wires by hard hats with a dielectric test of 10,000 v

Excerpts from Standard Specifications, Los Angeles Department of Water and Power

Hats: Protective, for Electrical Workers

General Description: The protective hats herein specified shall be suitable for use by the department's electrical workers who work in the vicinity of the energized 4,800-v overhead and underground lines and equipment.

Materials and Workmanship: The shell shall be made of a material that is water-resistant, acid-resistant, fire-resistant and a nonconductor of electricity.

Construction: The hat shall be supported by a cradle which shall be adjusted to give a comfortable fit to the wearer's head and constructed so that it will act as a shock absorber when the shell is struck. There shall be sufficient crown straps so placed in the assembly as to support the shell and they shall be made adjustable by the manufacturer so that a clearance between the wearer's head and the underside of the top of the crown of approximately 1¼ in. can be maintained. The material used for the cradle shall be soft, flexible, strong in tension, woven as a flat tape approximately 1 in. wide. The cradle shall be securely attached to the inside of the hat in a strong and substantial manner, so that it will not tear loose. No metal shall extend outside of hat.

Provision shall be made between the shell and the sweatband, or in the sweatband proper, for a free passage of air for ventilation purposes.

The weight of the complete hat shall not exceed 14½ oz.

Tests—Electrical: The protective hat shall withstand the application of 10,000-v, 60-cycle a-c for one minute without puncture of the shell or flashover from the outside surface of the hat to a metallic support for the crown straps and sweatband.

Tests—Strength, Inflammability: The complete hat shall successfully withstand the following tests:

Mechanical Strength: 40 ft-lb impact without denting or breaking sufficiently to touch the cradle.

Inflammability: The shell shall not burn at a rate greater than 3 in. per minute.

Water Absorption: The protective hat shall not absorb water in excess of 0.5% of its weight.

Colors: The protective hats shall be one of the following colors, as required. The craft designation shall be painted on the front of the crown and shall consist of a distinguishing mark, the lightning flash, in a contrasting color as shown below, approximately 3 in. long, indicating that the hat is designed for electrical use.

Color of Hat	Color of Mark
Yellow	Blue
Orange	Blue
Red	Yellow
Green	Orange

Heavy snowfall and winter storms did not deter construction. Washington Water Power was determined come hell or high water that . . .

The Line Must Go Through on Schedule

Built in record time and for the greater part under most adverse winter conditions, the Washington Water Power Co. has completed the 230-kv line that will transmit power from its 200,000-kw Cabinet Gorge plant to Spokane where a tie-in will also be made with the Northwest Power Pool. The $2½ million 77½-mile line was built by electrical contractor and Washington Water Power Co. line crews and completed well in advance of the Sept. 1, 1952, scheduled completion date for the Cabinet Gorge plant, despite a forced delay in starting construction and handicaps.

During the winter all access and construction roads were kept open by having a separate road contractor plow, sand and maintain 64 miles of roadway being traversed by the various crews. Large bulldozers and power graders were used to handle the heavy snowfalls in the summit areas so that work might proceed during storms.

About 35 miles of the line are in mountainous terrain, while the remainder is through valleys or over rolling hills. All except 10 miles is through wooded country where clearing was required.

Wintertime construction had to be resorted to under delayed agreement with the Bonneville Power Administration that is constructing a parallel line on adjacent right-of-way at the present time. According to BPA the access roads could not support traffic from construction of both lines at the same time. Actually the Washington Water Power Co. was prepared to start construction of its line during the summer of 1951 but BPA did not grant permission to use the access roads through public lands until October, and then only until April 1. Bonneville's line will carry power from the new Hungry Horse Dam near Kalispell, Mont.

The type of line selected by Washington Water Power was wood-pole construction using more or less conventional H-type structures with spar crossarms on tangents. These structures consist of two Class 1 or 2 poles, varying in length from 55 to 90 ft, with 40-ft spar crossarms. The poles are cross braced but with no braces on the arms. Sixty-five-foot poles allow spans of 60 ft on level ground. The longest span in the line is 2,575 ft. Both Western red cedar and full-length pressure-treated Western larch poles were used according to availability, while the spar arms are pressure-treated Douglas fir, 40 ft long, 12 in. diameter in the center section and tapering to 9 in. at each end. Only very small angles are turned on these H-type structures, the larger angles and dead ends being made on 3-pole structures with the insulator attachments directly on the poles.

Spring washers were used on all bolts to keep the hardware tight and all hardware is bonded and grounded except on the portions of the line where shield wires are used. Insulation of the line consists of 12 10-in., 15,000-lb units per string in suspension positions and double strings of 12 units in dead-end positions.

Conductors are 795,000-cir-mil, 26/7-strand ACSR sagged for 9,000-lb tension under National Electrical Safety Code heavy loading conditions, resulting in a normal tension of 4,000 lb at 60 F or about 13% of the ultimate strength. One of the principal reasons for this low tension is to minimize the danger of conductor failures because of vibration, for while preformed armor rods are used at all suspension positions no other vibration dampers are being installed at the present time. The conductors

are prestressed to 9,000 lb before sagging to the final position. This prestressing is not only for the purpose of giving the conductors a set but also as a test for guys and anchors, etc.

Shield wires are used only for approximately one mile at each end of the line and in these locations two 7/16-in high-strength stranded-steel wires are attached to the poles 10 ft above the crossarms. This results in an angle between the shield wires and the conductors of approximately 30 degrees.

The line called for 1,410,000 lb of steel reinforced aluminum conductor, 30,000 insulators and 1,300 poles.

Time was the main factor during the construction of this transmission line. The first survey crews were in the field early in March 1951, and by Aug. 15 the first right-of-way clearing crews were at work in the mountain areas. Five separate contractors were given contracts to start clearing operations in various locations that could be properly coordinated with the arriving and distribution of pole-line materials.

Each clearing contractor cut and logged the merchantable timber on his section of the line first, after which the remainder of the trees, brush and slashings were cut and piled. Where the terrain was not too steep, this operation was done by bulldozers, otherwise the work was hand labor. Just as soon as fires were permissible, burning operations were started. All danger trees were selected by using an Abney hand level with the setting taking into consideration the next 10 years of tree growth.

Five material stock-pile areas were selected on railroad sidings as near as possible to the line and one contractor was hired to unload, stock-pile and distribute all materials to the various structure sites as directed by company inspectors.

The longest haul was 32 miles since the road distance through the mountainous area was 64 miles. Since about 10 miles of the transmission line traverses the east side of Pend Oreille Lake, the poles and spar arms for this section of the line were trucked from the railroad siding to Bayview, unloaded in the lake and then towed to three separate beaches.

In the mountainous terrain the line passes over two summit areas, one south of Clark Fork, Idaho, where the elevation changes from 2,060 to 4,750 ft in four miles of line. The second summit is on the south end of Pend Oreille Lake where the elevation changes from 2,640 to 4,600 ft in 3.5 miles of line. The forest service roadways along with the spur access roads that had to be built to each structure site were naturally narrow, steep and had many switchbacks.

In order to spot the poles and spar arms properly, the hauling contractor loaded the poles between two trucks, stripped of their cabs and bodies. On each truck was built a full swivel-type structural steel bunk that allowed the poles to extend over the heads of the drivers giving unusual maneuverability. One truck was a 6x6 drive, the other a 4x4 drive. Poles and spar arms were loaded on and off these tandem trucks by means of a truck-mounted swing-type crane using a 20-ft boom.

In switchback maneuvers, the lead truck would make a 180-degree turn under the load so that the two trucks were facing each other. Then the rear truck would turn completely around under its end of the load. Now both trucks were ready to proceed in the opposite direction down the hill to the next switchback.

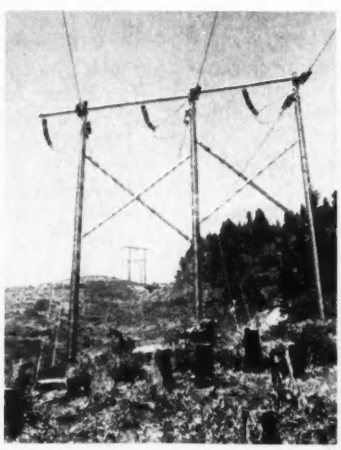
The reels of wire were hauled and spotted by means of a 6-wheel drive flat-bed-type truck on which was mounted a special H-type steel boom so that the reels could be loaded and unloaded by power winch from the same truck.

By the first of November two line construction contractors started digging holes and setting poles in the mountainous area. Truck-mounted compressor and mechanical digging machines were used where possible. Because of the mud and snow conditions encountered by the pole setting crews, both contractors used tractor-mounted 40-ft A frames for setting operations. Framing crews used portable generating sets for operating electric drills and power winches were used to raise the heavy spar arms into position.

During wire-stringing operations, one line contractor used a gang-operated reel stand while the other contractor used single-type stands with brake attachments. Large crawler-type tractors were used with long sock lines to pull out the three conductors. In long span areas, one contractor used a Kilgore Rocket Gun to shoot a line across the canyons. The other contractor used a portable Lyle cannon.

The presag and final sag positions of the wire were obtained by using a transit located on the ground at the base of a selected structure. The vertical angle for each sag was calculated and the wire sagged to this line of sight.

Cabinet Gorge 230-kv line uses H-frame X-braced wood pole construction with spar crossarms and simplified hardware assembly.



Left: Installing preformed armor rods. Center: Dead-end structure. Right: View in mountains. Tower line at left is Hungry Horse line

ELECTRICAL WEST

A Raise Without Bargaining

FOR weeks and months in various units in the electrical industry here in the West collective bargaining has been underway between management and labor to arrive at new working agreements. Many have been worked out readily and amicably. In others there has been the threat of strike and compulsion. Still others await settlement. In most of the settlements there have been wage and salary adjustments which have required Wage Stabilization Board approval.

How different from all this was the pay hike announced in the press last month for officials in the steel union following the settlement of the long and costly strike. President Murray's pay went from $25,000 to $40,000 per year. Several vice-presidents were raised from $15,000 to $25,000. A batch of 33 district directors were hiked 50%—from $8,000 to $12,000. One wonders about Wage and Salary Board Stabilization in this case.

For those of us who work for private industry, whether officials or just plain ordinary workers, the regulations say merit increases must not exceed 10% for the individual and 6% for a group, over and above an increase attributable to cost of living. But then private industry doesn't have the political connections of the union bosses. "Union security" is great stuff for those at the top of the unions.

Can You Sell the American Way ?

ARE you ever frustrated in your endeavor to spell out for someone a sound understanding of the economics and arithmetic of our freedom for our own self-preservation? We are. The frustration stems both from an inability to tell the story simply and from the seemingly overpowering job of telling it to enough people in time to bring about understanding and action. If the job is ever to be done of indoctrinating a safe majority of adult Americans with enough economics to guide them properly and to keep the demagogues from guiding them improperly, the people must do it themselves.

Such a program of self-education on a mass basis is being tested by General Electric at the present time. Key instrument is a catechism produced by Dr. Lewis H. Haney, university professor and newspaper writer, and published by Prentice-Hall. It is a guide to be used in small discussion groups that seek to learn about money and inflation, direct and indirect taxes, incentives, savings, competition, risk and profit and loss.

The time for educational activities of this kind is short. The need is great. The desire of people to learn exists. The whole industry should undertake to do something about it.

Light Let Loose

ONCE more, lighting for the home, store, office, and even place of amusement, is released from shackles imposed by government controls. A few still remain, thanks to the political, if not patriotic, steel strike, but these should be removed as the steel industry gets back into total production. As some of the huge orders for thousands of industrial and office fixtures for big defense projects are completed, the lighting industry will again face the necessity of selling to much smaller units and many more of them. It will be another return to what used to be called normal market conditions.

Facing such a "new" situation, the question arises whether the lighting legions of this electrical industry are prepared for that kind of individual selling, it has been so long since it could be done.

True, the momentum of past educational selling of lighting is still carrying on. Acceptance of ample installations and high levels is general. More and more uses of special and dramatic lighting methods are being made by designers and architects. Those who could build at all recently have strained the regulations to get as much lighting as possible. But can the industry coast long in such a way?

EDITORIAL VIEWS

As for home lighting, it is encouraging that several strong drives are being made to gain back the ground lost to the dark interior fad. Lamp manufacturers and utilities are teaming up again to bring education on lighting into the home again as was done so well in the 1930's.

The first service of the industry—lighting—is still the most important service to the community. With controls lifting it is high time to take the wraps off of selling as well. Lights aweigh!

A-B-C's But No 2x2's

WHEN folks in the electrical industry begin wondering about where the future engineers are going to come from to staff this great business, they might ponder some recently developed facts. Many of the colleges report that less than half of those secondary school graduates applying for registration as engineering students possess the necessary instruction in mathematics and science to qualify. Surveys show that only 20% of all high school students study mathematics; that 12% only enroll in chemistry; and that physics—a basic course for almost all engineering—attracts but 5%.

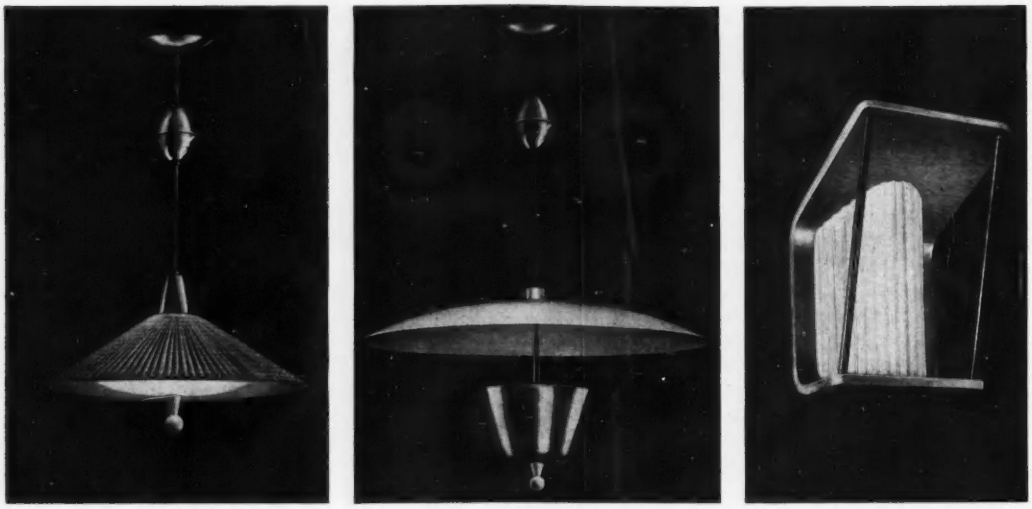
Without seeking to set the blame for this situation, one may reasonably wonder why the high schools themselves fail to take corrective measures. In an age when science and technology affect every phase of modern living one would expect science and mathematics to be required courses for all students. One might logically assume that modern educational programs would teach young people those things that would assist them to live, work and think in terms of the technological and scientific age in which they will live their adult lives. Mathematics and science should be a "must."

Educators are likely to say that "we teach what students and parents want." Moreover, the tendency toward the "easy life" and "security state" has had a definite effect. Homework is unpopular and is not encouraged. The school curriculum appears to be based on the theory that a sound educational foundation can be formed without serious effort.

Corrective measures will come from two sources. Parents must understand the importance of mathematics and science and insist that school curricula require them. And those industries in which engineers play a prominent role must sell the advantages of an engineering education to young people and to those who counsel them.

You Can Say That Again

IN our friendly neighbor city of St. Augustine great flocks of sea gulls are starving amid plenty. Fishing is still good, but the gulls don't know how to fish. For generations they have depended on the shrimp fleet to toss them scraps from the nets. Now the fleet has moved to Key West. The shrimpers had created a Welfare State for the St. Augustine gulls. The big birds never learned how to fish for themselves and they never taught their children to fish. Instead, they led their little ones to the shrimp nets. Now the sea gulls, the fine free birds that almost symbolize liberty itself, are starving to death because they gave in to the 'something for nothing' lure. They sacrificed their independence for a handout. A lot of people are like that, too. They see nothing wrong in picking up the delectable scraps from the tax nets of the U. S. Government's 'shrimp fleet.' But what will happen when the government runs out of goods? What about our children of the generation to come? Let's not be gullible gulls. We Americans must preserve our talents of self-sufficiency, our genius for creating things for ourselves, our sense of thrift and our true love for independence.—From an advertisement of the Barnett National Bank, Jacksonville, Fla.



Modern contemporary designs in ceiling fixtures for the dining area and a wall unit for hall or doorway fit modern house styles

THERE'S MONEY AGAIN

for contractors in Home Lighting Fixtures who know how to approach the

- **New owner-occupied house market**
- **Mass builder market**
- **Replacement market**

Nat Blumberg*
Lightolier Co.

Home lighting fixtures are enjoying new popularity and sales-minded electrical contractors can cash in.

A change has taken place again.

Not too many years ago architects were eliminating ceiling fixtures and brackets, and interior decorators were advising clients to remove fixtures and cap up outlets. Portable lamps were to be the basis for home lighting.

Today's home owners are finding that a combination of portable lamps and lighting fixtures provide the best general illumination. With architects and decorators back on the fixture band wagon, with home owners aware of the need for better lighting and the decorative value in the new good designs available, electrical contractors have a golden opportunity to do a profitable business in residential fixtures.

New trends in home construction are unmistakable. They require lighting that, aside from the decorative value, must provide adequate, glare-free lighting. Let's look more closely at these trends:

The dining-living area with its fold-away dining table calls for a fixture that can be lowered over the table when the room is used for dining, then raised out of the way when the room is converted from dining to living room. New fixtures on reels that pull up and down are available, some with plastic or glass diffusers to eliminate harsh glare. Some carry their own ceiling in the form of a large inverted dome. With the dining-living area increasingly used and the demand for casual modern dining furniture booming, the new up-and-down reel fixtures are here to stay and are high-profit items for electrical contractors.

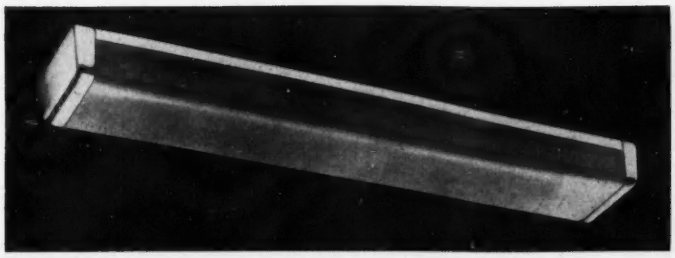
The new kitchen, long and narrow, with plentiful cabinet space and long counter areas for the many routine kitchen tasks, calls for long light sources that will spread the light over all work areas and deep into cabinets. A shielded two-light, 4-ft fluorescent is the modern and efficient way to light the kitchen. It costs more but surely the kitchen with its garbage disposal, electric dishwasher and streamlined appliances calls for up-to-date lighting. The opportunity to sell good lighting here in the work shop of the home is great, if contractors will try to match the advances and conveniences offered by other suppliers of kitchen equipment.

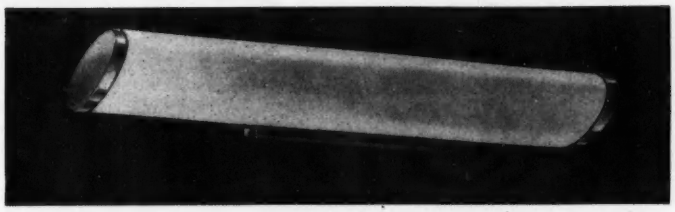
Outdoor lighting provides another great opportunity. Patio living, outdoor barbecuing and entertaining require more outdoor lanterns, more floodlighting, garden lighting and weatherproof convenience outlets, in short, more fixture and wiring business.

Most men shave every day. To many it is an unpleasant chore primarily because the lighting is inadequate at the medicine cabinet. Women who make up in the bathroom would also prefer a pair of shielded brackets, vertically mounted, at the cabinet for increased efficiency.

It's an extra outlet, a more profitable fixture sale, and Mr. and Mrs.

* As condensed from a talk to the NECA District 8 meeting at Colorado Springs.





Smart and streamlined are new fluorescent fixtures for the kitchen and the bathroom

Homeowner will be grateful to you for making a daily task lighter at a very small increase in cost.

The trends are clear, the market is ready and large. What can you, Mr. Contractor, do to take advantage of it?

Your Supplier's Display Room

Make an appointment with the manager of the home lighting department of your supply and fixture distributor showroom. Ask him to show you the new fixtures and their selling points. Ask him for the leading manufacturers' catalogs so you can study them.

If he is not carrying better fixtures on which your profit opportunities are greater, urge him to put in a good variety. If his showroom is run down, remind him **his** and **your** sales will be greater if he spruces up. (A few cans of paint do wonders.) After all, he merits your business only if he gives you service and he is falling down on his part of the job if he doesn't provide you with all the tools most profitable and best to complete your jobs.

The Owner-occupied Home

On all owner-occupied home-wiring jobs, and speculative home-wiring jobs where the house is sold prior to roughing in, make an appointment with Mrs. Homeowner at the job to go over outlet placements with her. She has a pretty fair idea of her furniture placement and will appreciate the opportunity to space outlets where she needs them. This is your chance for some selling, selling to build up the wiring job and the beginning of a good fixture sale.

Fixtures Really Sell the Wiring

Go through the house from the outside in and room by room. On the outside, suggest a post lantern, weatherproof receptacles, patio lanterns and spotlights. Point out how much can be saved by putting these outlets you are going to suggest in now instead of later. Show her mercury switches, point out the need for vacuum cleaner outlets, clock outlets, closet switches, mantle outlets, double switches and a service large enough to take care of all future needs.

Bring up the fixture selection by pointing out the need for clearance of the door in the entry hall. Show her your fixture catalog, pointing out the new up-and-down fixture for the dining-living area.

Ask if her husband shaves every day and wouldn't he appreciate the kind of lighting that will enable him to see under his chin and get a better shave. Don't forget the vaporproof shower light.

Tell her about the new long kitchen fixtures that give daylight in the work room of the house and will light up all her counter areas and cabinets. Mixer outlets, exhaust fans and plenty of appliance outlets—all can be added.

At the end of your tour through the house, arrange an appointment for her to visit your fixture supplier. Tell her you will make a list of the outlets and fixtures in which she showed an interest, and that the XYZ Electrical Supply fixture department will have the list and help her select the right lighting.

Point out that if she makes her selection **now** at the framing stage, you can put in the right outlets for her fixture selection and avoid costly changes later.

This hour spent going over the house will add profitable extras, increase your customer's confidence in you and pave the way for a fixture sale on which you can make more money than you did on the wiring.

One word of caution, explain that the original plan called for an average wiring job but that only **she** knows what **she** will need and where.

To Sell the Mass Builder

The mass builder presents the greatest challenge to electrical contractors for better fixture sales. Low allowances and fixture selections that just fill outlets have been and are still with us.

In the past year, however, many builders have recognized there is little of decorative value in an empty house for sale, except the lighting fixtures.

If electrical contractors will point this out, if they will show the builder how a good lighting installation can help him sell his homes faster, the result will be better fixture orders and higher allowances.

Builders advertise their homes as having the very latest conveniences and yet in most cases the lighting is not unlike that used in homes built 20 years ago. Let's show the builder how his salesmen can use **decorative lighting** in each room as **a selling feature** and as an indication of the quality of the house.

The Light Conditioning program is picking up momentum. It helps sell houses faster at full prices and the increase in cost is but little more.

To Sell Style Changes

Replacement lighting is another important source of business for sales-minded contractors.

Thousands of families are buying the new modern or provincial furniture and unless the fixtures in these rooms are replaced the room is dated. Only half the redecorating job is done.

This market is best reached by small but regularly run newspaper ads suggesting to home owners that

replacing fixtures is an inexpensive but effective way to redecorate. Layout, copy and mats are available to electrical contractors from leading fixture manufacturers.

Even on repair calls, showing a fixture catalog pays off. Mrs. Homeowner has very likely considered changing her fixtures. An introductory card to your fixture distributor can lead to a refixturing sale.

Let's forget the old bugaboo, "fixtures come last and when they get around to them there is no money left." Fixtures are the first of the decorative home furnishings and if a good selling job is done there will be more money for fixtures and less for landscaping and other things that can be bought a year or two later.

House wiring is a tough, competitive business. If the going is rough in your town, "see the light" and get on the fixture band wagon. You'll find there are lots of good profits to be made for just a little selling effort.

Radio Specialties Co.'s customers see but don't touch. Salesmen serve them as they —

To Promote Lighting

The National Home Lamp Council has been formed by lamp manufacturers representing Los Angeles, San Francisco, Chicago, New York and Philadelphia locals of the Lamp and Shade Institute of America. The council has engaged Bozell & Jacobs agency to conduct a national advertising and public relations program. A complete promotion package, "The big news in lighting is floor lamps!" is available for guidance in promoting at a local level while the council will run ads in national home magazines. Newspaper publicity and billboards are also to be developed. Bernard Roberts of Modeline Co., Los Angeles, is on the board of directors.

Westinghouse Lamp Division has a new booklet for distribution to the home called, "Better See-Ability," by Myrtle Fahsbender, home lighting director at Bloomfield. It shows drawings of the various types of light bulbs and tubes used in home lighting, their adaptability to various kinds of typical fixtures, bracket, table and floor lamps. New bulbs and bulb finishes now available that are listed include the white permanently etched frosted lamps, the white indirect with a three-way 50-100-150-w filament; bug repellent lamps, the Odorout bulb to destroy odors with ozone, the decorator bulb, a Permacote Christmas bulb with fused-on colors.

Order from a Complete Supply

Where the average parts distributor displays most of his stock and uses as much as 60% to 100% of his total area for display, Radio Specialties Co. of Los Angeles does just the opposite. It uses 10% for display of everything carried in concentrated panel and group displays, then gives 90% to the warehouse. With this goes a change from the now popular serve yourself style to what S. K. Painter, its president, claims is a faster service at the counters from stock. The display panels and groupings give the buyer the name and parts number and this is quickly delivered from well-ordered and efficient stock shelves in the warehouse.

This method of wholesale distributor display and delivery was dramatized when Radio Specialties celebrated its 20th anniversary by opening this new type of operation, four years in the planning. Located in the heart of a growing electronic industry, stimulated by the movie, television and electronic defense equipment activity in southern California, the company has 10 salesmen in the area, five more industrial salesmen and an export-import department. It has sponsored educational meetings for its dealers and industrial customers, has developed forms for service dealers to break down their charges for radio and TV repairs and other helpful activities for its trade.

The warehouse has a conveyor system to expedite handling of packages both incoming and outgoing. The design was carefully developed to speed serving of customers. The counter catalog racks are built in to the counter and shielded. A warranty test bench is close to the counter. Counter salesmen can get all information without leaving the counter. Teamwork among the staff developed the methods used and in many instances the work of designing and installing was done by those who are now operating this different type of parts distributorship.

General Electric Co., to back up its comprehensive light conditioning program, has implemented it with a wealth of educational, sales promotional and selling material. A large brochure sets forth the reasons for the light conditioning program and what all can do about it. The program suggested by it includes model light conditioned homes, dramatic displays, movies that G-E has made available, booklets, etc.

ELECTRICAL WEST Sales Guide News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

September 1952

Business prospects for the fall are good. Not that things will be easy, but they can be good. Since the steel strike manufacture has started again but not on a scale to glut the market and invite deals, dumping and declines. Some **automatic washers** and **dryers** are in short supply and some freezers. But most other appliances are ample though particular popular models may be scarce. Dealers have been cautious about inventories, to the pain of distributors perhaps, but for the good of their own financial position.

Fair prediction

Most appliance makers are putting their wad into **TV and national advertising**, it seems, hoping to herd customers to dealers that way but what is needed more is salesmen's incentive to milk the herd. There seems to be a lack of contests and trips to Hawaii to dangle before 'em.

No carrots

As **Tighe Woods** succeeds **Arnall** as **OPS** chief and that agency is falling apart, decontrol of some appliances and TV has come and more can be expected. Last order was to allow refrigerator and range makers to change from F.O.B. to delivered price basis. Only recent raise in prices has been from **Philco**, which raised **TV sets** and **refrigerators** a few dollars but surveys showed few manufacturers inclined to follow suit. Both **Sears** and **Montgomery Ward** fall catalogs list price reductions of many items, including ranges, TV, radio, freezers. **Stromberg-Carlson** added 5% to its TV discount instead of cutting price.

Decontrol and prices

Bakersfield area dealers were hit two ways by the severe earthquakes. Their stores and merchandise were damaged and business has been bad since. **Urner's** downtown store was a complete wreck but he has put up a shelter at the main store on the lawn to dispose of merchandise from the battered store. **Brock's** was so damaged it has moved into a circus tent in Westchester district. **McMahons**, damaged in the first quake, was braced for the second. **Moore's** building is condemned. **Gundlach Plumbing's** rear was wrecked but has moved up front. **Weil's** separate appliance store was demolished but appliances are moved into the main store. At **Arvin** the **Gambles-Western Auto** store was worst hit in town. At **Tehachapi** **Emil Lang's** place was wrecked. Business has been hit by the disaster and by hasty evacuation of many people, some leaving uncompleted contracts to worry about.

Big shakedown

A **Department of Agriculture** report on **home freezer** use in Arizona over several years has the industry hopping trying to deny its conclusions that freezers save trouble if not money, reduce shopping time, are economical only where home-grown fruits and vegetables are processed.

Deflate story

Fair Trade

Fair Trade is getting back on the main-line tracks again as company after company declares itself. Among those who have re-established contracts are Sunbeam, Toastmaster, Landers, Frary & Clark, Proctor, Lewyt, Cory, Dormeyer, Waring, Necchi, Oster and General Electric. The latter has even put an executive in charge of an enforcement department. As Fair Trade is restored small dealers again are featuring appliances but Schwegmann, of New Orleans, supermarket operator who cracked it before, is out to break the McGuire Act also.

Jet propelled

San Diego Bureau of Home Appliances is like a six-ring circus with its 20th anniversary banquet coming up Sept. 26 at Hotel del Coronado, at which Dr. Allen B. DuMont, TV and electronics leader, and John C. Sharp, president of Hotpoint, are featured speakers. Coincident with this is Electrical Living Week, starting with dedication of San Diego Gas & Electric Co. new 50,000-kw generator, Sept. 22. Also going is an automatic dryer promotion, a creative selling course, another "Yes-but" selling contest for dealer personnel, a series of TV-radio apprenticeship and service courses, a television sports broadcast promotion, and an active contractors division lighting program. Just elected officers for the new year are George H. Stoltenberg, La Mesa dealer, as president; Robert D. Halvorson, La Jolla dealer, vice-president; Lee Bornstein, distributor, second vice-president; Gordon Dawson immediate past president. J. Clark Chamberlain is manager. And space for its big annual Electrical & Home Appliance Show, Nov. 28-Dec. 3, is booked practically solid.

Show biz

Space in the San Francisco Western Living and Home Exposition at the Civic Auditorium, Sept. 27-Oct. 5, is likewise going fast, according to LeRoy H. Bennett, Northern California Electrical Bureau manager. One whole wing of the auditorium will be devoted to the light conditioning story of the home. Appliance exhibits will be in the main hall with home and garden exhibits, building materials, etc. On the stage will be Leisure House, as setting for top-name entertainers.

...is big biz

Los Angeles Home Show closed its 11-day run at Hollywood Park with a record 181,158 attendance, 20,135 more than last year. More space, cooler, more parking area and a Spike Jones show were contributing factors to its success. Many electrical appliance distributors were among the 300 exhibitors.

More coming

Phoenix was getting steam up for its 3rd annual TV Exposition, Sept. 25-27. Bob Van Valer is show chairman and plans to have TV stars and local shows, displays and lots of promotion. It will be held in the Industrial Building at the state fair grounds, sponsored by Appliance Merchandisers Assn. The association, by the way, plans to change its election date from August to November for change of officers in January to accord with its calendar-year program of promotions.

Busy leagues

Other promotional league news--Inland Empire Electric League in Spokane has started a weekly radio program called TV News on Saturdays at 10:15 p.m. to prepare the public for television and answer its questions. Its promotions for September-October are on home laundry equipment, with a junior salesmen week feature of demonstrations of ironers. . Los Angeles Electrical League took a prominent part in the recent Home Show; has an active advertising standards committee, an electrical contractors division, a Light Conditioning program by its lighting committee. . RMEL is holding its annual convention at Glenwood Springs, Colo., Sept. 8-10. . Intermountain Electrical Assn. is gearing fall campaigns after holding its big annual picnic in August. . IAEL holds its annual managers' meeting Oct. 1-4 in Minneapolis.

Montana Power Co. has put itself on record with all the trade as to its "Policies, Practices, Plans for service to our customers and co-operation with our associates in the electric and gas industries," in a clean-cut 32-page pamphlet. D. J. McGonigle, general sales manager, sets forth the company's views on the part the manufacturer, distributor, dealer, architect, electrical contractor and plumber should play in business development, then tells Montana Power's part. It declares a no-merchandising policy with reservation to sell again if it becomes necessary, especially in residential lighting. It offers a number of aids to dealers to make it a better business for all.

Makes its policy clear

Men making news--Floyd Lovelace succeeds Bob Cockfield as manager of the residential section of Los Angeles Dept. of Water & Power, Bob Cockfield now being business agent. Lovelace was his assistant. . S. E. Morton is Western sales manager for National Sewing Machine Co., whose headquarters are now in Beverley Hills. Morton is at 3012 S. 2520 East, Salt Lake City. His territory covers 16 branches on the Coast and to Salt Lake. Graybar is now national distributor. . . Charles Earl Germaine left Crosley as Western regional manager to join the staff of California Electric Supply Co., Crosley distributor, in San Francisco. . Ned Paine, formerly with RCA, becomes southern California regional sales manager of Stewart-Warner as Phil Wood was recently made merchandise and field sales manager. . Seymour J. Cooper was elected president of Emerson West Coast Corp. when David Hopkins went to New York. Irvin F. Applestone has been made field sales manager and James D. Lane is now in the Pacific Northwest as regional representative for Emerson. . Harry Kaye, Kaye-Halbert president, announces Hans Berger, former production manager, is now vp in charge of operations and production, and John L. Lyons is now national director of sales; he was formerly general sales manager.

People

And Marshall C. Wells is now general sales manager of Golden State Appliance Distributing Corp., the Admiral-owned company recently organized. Wells left Hoffman Sales Corp.; prior to that was with Sues, Young & Brown. . And in San Diego, Mike Nicolin, Admiral branch manager, appointed Wm. Doyle as sales manager, formerly with I-H. . Mark W. Battersby was raised from Pacific Northwest district sales manager of Murray Corp. Home Appliance Div. to be West Coast regional sales manager with headquarters in San Francisco. . James Scales takes over as sales manager of the Motorola division of W. J. Lancaster Co. and Gil Freeman is sales manager of the appliance division. . As Kassler & Co. took over southern California distribution of Arvin lines Nate Hast was appointed vp and director of sales, a former mid-West Olympic Radio man, and in San Diego Carl Lantz, former Admiral, is the Kassler manager. Arvin shifted James B. Hofer, former West Coast district manager to become So. Cal. manager for Arvin's housewares and Elmer Jorgensen from Marshall-Wells, Portland, is West Coast Radio and TV manager.

do

More: Milton L. French is service representative for Youngstown Kitchens for distributors in Fresno, Billings, Portland, Seattle, Spokane, Denver, San Francisco, Reno and Salt Lake City. He is a former San Franciscan, has been with Meyberg, Thor. Will headquarter in Fresno. . J. H. Mosher is now Pacific Coast regional manager for the Permutit Co. with offices at 124 W. 6th, Los Angeles. . Clyde Allen has put Wayne Dinsmore Jr. in charge of the Dexter home laundry equipment sales in southern California. And Jules Alexandre, who was West during Market Week, is now Duchess Appliance vice-president. . Well-known Ben Rogers of San Diego, lately with Ray Thomas Co., is now local rep for U. S. Grant Supply Co. of Los Angeles.

change

TV shorts

Color talk is coming back into the television picture, even though it is years away. The RTMA industry committee to develop an all-electronic compatible system reports much progress, better pictures and will be ready to demonstrate to FCC soon. At Long Beach R. H. Hyde, FCC vice-chairman told the Western Electronics convention that FCC is willing to listen. Les Hoffman opined that color sets would cost about 2½ times b&w. . Portland will have the first UHF station soon as well as its first TV station, one being rushed now by Empire Coil Co. Hopes to be operating by Thanksgiving. . The ABC-Paramount merger is held up while the antitrust aspects of it are explored by FCC. . The Federal Reserve Board reports that only 1 in 10 families with incomes of $2,000 have TV sets, despite opinions, while 6 in 10 of those in the $7,500 do, and that 1/3 of the nation have sets in 3 years of selling.

.. and news

"The Miracle of TV," a movie made by Kaye-Halbert of Culver City, will be premiered at the Coronet Theater, Los Angeles, Sept. 14. It will be shown in TV-casts throughout the nation. . Kaiser will get into the TV business as Kaiser TV Corp., with Jack Richmond, who launched Natalie Kalmus TV, as president, making de luxe combination sets under the classy name, Dunhill TV. . Raytheon Mfg. Co. will change its subsidiary's name from Belmont Radio Corp. to Raytheon TV & Radio Corp.

Denver's distributors

Denver is still TV-crazy with a prospect that it will go wilder when a second station and also the World Series goes on the air. Every kind of store and service station is selling sets. Distributors are appointed right and left. Here are some: Packard-Bell appointed two--A. H. Frost and George C. Mills and has set up a factory service division. Austin & Son distribute Arvin. B. K. Sweeney has DuMont. Allyn Distributing Co. has Tele-King. Parker Co. has Stewart-Warner. Marcus Bros. has the CBS-Columbia. Kaye-Halbert appointed Century.

Other changes

Distributor changes lately--Eureka Vacuum Cleaners, formerly distributed state-wide in California by Meyberg, now has the new firm Horn & Cox Inc., in Los Angeles, Gold-E Distributors in San Diego and W. J. Lancaster in San Francisco. . W. F. Distributing Co. of Denver is Sanitary Refrigerator Co. handler in the Rockies. . Pacific Northern Appliances with Sam H. McConnell, president, takes over the franchises formerly held by Pacific Telecoin Corp., which include CBS-Columbia TV and radio, Quicfrez and Columbia freezers, Bendix commercial laundry equipment, Elna sewing machines. . Kierulff & Co. of San Diego is separate from the Los Angeles company, stressing electronics parts, and Ed Nystrom, its manager, also distributes Amana freezers.

More TV

Pacific Mercury has closed a deal to manufacture sets for Sears, Roebuck & Co. in Los Angeles, becoming a large producer. In Seattle this company has appointed F. Roy Chilton, president of Keyco Distributors, distributor for its own brand line in Washington and Oregon. . And Bendix TV has named Kelvinator Division as its distributor in Los Angeles and San Diego, Graybar for S. F. and the Northwest.

Room size

Servel has something completely new and threatens something even newer in its next refrigerator, which will be an electric compression-type job. But the new now is its Electric Wonderbar, a small absorption-type refrigerator for offices, parlor, bedroom, a second refrigerator for any room for snacks, ice cubes. Plastic case in three finishes. Sells for $149.50, $10 extra for legs and casters or blonde finish.

Scaled down

Both Sunbeam and General Electric will bring out small portable mixers for around $19.95 for those who can't reach up to the present price mixers have soared to and to compete with successful rivals.

'What's Cooking' in Light Throughout the West

Home relighting will get the same all-out drive that street lighting and school relighting received in Denver from the sales-minded Public Service Co. of Colorado and its allies in the industry through the Rocky Mountain Electrical League. This complete program, in preparation for a year, was launched at the RMEL annual convention at Glenwood Springs, Sept. 8-10, by Gaylord Buck, vice-president and commercial manager, by means of a three-act live dramatic show, *The Magic Key*, on which some 60 people had worked for months.

This show is so designed as to be taken, either in its entirety or as separate acts, throughout the RMEL area to public meetings, fairs, schools, clubs, service groups. Its three acts are: "The Torch of Freedom," in which it is shown that light has brought mankind freedom through the ages; "Partners in Progress," a "House of Magic" type of show, to link Edison and his inventions with light and progress in modern technology; "Horizons Unlimited," the home lighting improvement story itself.

The sales drive behind this spectacular and live dramatic promotion is an example of logistics in selling. To alert and prepare the dealers, contractors and suppliers for their part, the Builders and Dealers Department of Public Service Co. has conducted training meetings for drapery people, lamp department people and lighting dealers, under J. A. Stockett. Jack Reed, building contractors' representative, has worked with builders to exhibit model homes with light conditioning as a feature. The Electrical Living Institute in the company's building has given lectures on home lighting. Company letters plug valance lighting with the postage meter. The company's monthly house organ, *Home and Community Service,* has featured it each month. So has newspaper and radio advertising and TV will also be used. In the direct sales, under E. M. Rowland, 26 men are ringing doorbells and giving a lighting sales story to sell Certified Lamps and valances. Distributors and dealers are tied in to this program also. In brief, it is an all-out program.

It had been hoped that pictures of this dramatic presentation would be available in time for a feature story on it in this issue but the preparation of scenery, costuming and staging had not reached such a status at press time. Pictures taken at its original showing at the Rocky Mountain Electrical League convention, however, will be published here in an early issue, along with more details as to the campaign.

What Others Are Doing

What lighting activities are being carried on by various leagues and public utility companies in the West this fall can be summarized quickly thus:

Utah Power & Light Co.—Has a model living-dining room set that is being exhibited and lectures on home lighting given from it to public audiences and to trade groups in the industry. (See ELECTRICAL WEST, July, p 87.)

Southern Colorado Power Co.—Has certified lamps on sale at its offices, does advertising of home lighting; has a lighting engineer assisting commercial and industrial designers; has held a lighting course and initiated a new chapter of IES.

Idaho Power Co.—Sells certified lamps from its offices and will conduct an annual lamp bulb campaign with dealers.

Washington Water Power Co.—Its illuminating engineers have always been active in assisting in lighting design. Last year the company tried a certified lamp sales campaign, made optional in its various divisions, and may do the same again.

Inland Empire Electric League—On its fall schedule of promotional events in October a series of demonstrations featuring lighting equipment and in November home light conditioning. The supply and apparatus section will feature commercial lighting in September.

Montana Power Co.—In its just-issued booklet to the industry on Policies, Practices and Plans, the Montana Power Co. says, "Since residential lighting has not developed satisfactorily under the nonmerchandizing policy, the company reserves the right to engage in the sale of lamp bulbs and such lighting equipment as may be necessary to provide its customers with the advantages of modern lighting developments."

Pacific Gas and Electric Co.—Has commercial lighting engineers in all divisions, one of which issues data sheets to contractors and the customers to show what factors are to be considered when installing fixtures. Its home service home economists give illustrated talks on home lighting.

Northern California Electric Bureau—Besides sponsoring light conditioned model homes with builders throughout the area, one large wing of the Civic Auditorium will be devoted to displays and movies of home lighting at the Modern Living and Home Show it is staging in San Francisco, Sept. 27-Oct. 5.

Southern California Edison Co.—Has a large staff of adequate wiring advisors contacting new home builders selling both adequate wiring and light conditioning. In the commercial and industrial field it has a thoroughly trained staff of illuminating engineers.

Electric League of Los Angeles—Has an active lighting section that is advertising, displaying and selling home lighting, using light conditioning banners in store windows of members. Department of Water & Power is backing with some advertising.

Los Angeles Department of Water & Power—Has a staff of illuminating engineers who act as consultants to any commercial or industrial customer on lighting designs. The adequate wiring staff also advises home builders on light conditioning. (See ELECTRICAL WEST, August, p 88.)

San Diego Gas & Electric Co.—Its lighting advisors aid in designs, then publicize good lighting installations by sending all customers data sheets about them. Lighting is stressed in the adequate wiring plans prepared for customers.

Bureau of Home Appliances of San Diego County—Its contractors division advertises the services of electrical contractors to assist in both lighting and wiring. Lighting played a prominent part in the section's exposition building devoted to contracting and wiring.

Arizona Public Service Co.—Was active selling certified lamps to homes last year and likely will carry on some such fall campaign again.

While some public utilities have not been mentioned because they have announced no specific campaigns or activities, all offer advisory service to lighting customers in domestic, commercial and industrial fields.

AIEE Emanates from A to Z in Arizona

Phoenix in August proved no deterrent to a good attendance at the Pacific General Meeting of the American Institute of Electrical Engineers held in Phoenix, Ariz., Aug. 19-22. The more than 500 who registered not only suffered no discomfort in the air-conditioned Westward Ho Hotel, but found excellent accommodations, a well-rounded technical and entertainment program, interesting inspection trips and hospitality in abundance. Many were the expressions of commendation for the splendid job done by the Phoenicians in handling the large undertaking of staging an AIEE convention.

The importance of water to the economy of Arizona was stressed in opening remarks by both Henry B. Sargent, president of the Arizona Public Service Co., and Stanley A. Ward, general manager, Salt River Power District. Sargent expressed hope that a move to get the Colorado water dispute before the courts for adjudication would prove successful. He feels that the Pacific Ocean may be the ultimate solution to the water problems of the Southwest and said that a newly announced process for obtaining fresh water from sea water at an energy consumption of 20 kwh per 1,000 gal as against 100 kwh by distillation, if successful, would make water costs about comparable with pumping costs for Colorado River water. Ward called attention to the fact that the Salt River Project in Arizona is the second oldest and most successful irrigation project in the United States.

The technical structure of the institute has been undergoing an evolutionary change in the last six years and we can all take considerable satisfaction in the results that have now been achieved, said Donald A. Quarles, AIEE president. The board of directors set out in 1946 to broaden and strengthen the technical structure by (1) organizing it in five technical divisions—communications, general applications, industry, power, and science and electronics, (2) increasing headquarters staff support of technical committees to cover new or expanding areas of electrical technology. Today there are set up under these five divisions some forty technical committees with almost two hundred subcommittees, including such relatively new fields as electronics and nucleonics as evidence of the progressive policy that has been followed. Paralleling this evolution in technical structure there is being inaugurated this year a new publication policy which will be of general interest to the members, Quarles said. The fact that the membership of the institute has more than doubled in the last ten years and is now approaching 50,000, he said, is evidence of the youthful vigor of the organization.

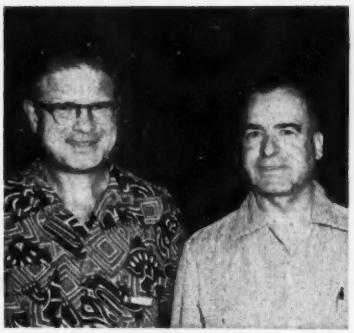
Transmission and Distribution

Five papers were presented in the session on transmission and distribution. A report on field tests on a 135-kv, 3.5-million-kva, low-oil-content circuit breaker, reported by Paul Wildi, W. H. Clagett and Lloyd Morgan, Pacific Oerlikon Co., Tacoma, raised the question of adequacy of present ASA standards for testing oil circuit breakers. In two tests approximately the same by ASA standards, one actually showed double the duty of the other. E. C. Starr, Oregon State College, in a prepared discussion, said that the OCB test code should be modified. It was mentioned that an

Quarles Redmond

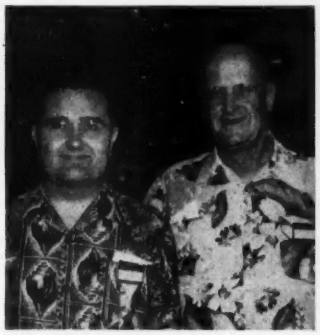
Beckett Rockwell

Sargent Ward



Woolgar Bulmer

Willson Lovell



Keith Tanner

AIEE subcommittee is now working on revisions.

In a paper on the effects of wind, dust and smoke on radio influence from transmission lines, authors G. S. Smith and A. B. Jacobsen, University of Washington, concluded from tests that there was little evidence of any effects of wind velocity, dust or smoke upon the amount of radio influence produced on transmission lines. M. J. Lantz, BPA, showed that the two-line equivalent circuit for mutual impedance permits the solution of many problems on the d-c type calculation board that have heretofore been regarded as a-c network analyzer problems. Comparison of results by the two methods shows them to be in excellent agreement, he said.

T. M. Austin, USBR, presented a set of charts that has resulted in considerable saving in making the proper selection of structures and guys on transmission lines, especially at points where the required structure would have been left in doubt when using former types of charts. In a paper on the switching of high-voltage capacitors, R. C. Van Sickle, Westinghouse, said that the switching of high-voltage shunt capacitor banks under normal conditions can produce high surge currents which, if parallel capacitor banks are on the same bus, may be up to 70 times the normal current. The overvoltages during interruption can be eliminated by the use of circuit breakers which do not restrike, or can be reduced by modifications of the breaker, he said.

Western Chemical Industry

The development of the Western chemical industry was reviewed in a paper by G. L. Parkhurst, Standard Oil Co. of California. He concludes that the outlook for further expansion and development of the Western chemical industry is excellent. Opportunities for growth now exist, and as Western population, industry and agriculture continue to expand, these opportunities will increase with each passing year.

High fault energy resulting from tie-in with the Bonneville power system has been one of the prime power problems of the past few years in the pulp and paper industry, said E. E. Dale, Crown Zellerbach Corp., Seattle. Control is another big problem. Extensive modernization to meet these problems has been necessary, according to Dale.

Electrical problems in petrochemical process control were discussed by D. J. Pompeo, Shell Development Co. Precise control of process variables is one of the requirements, he said. New types of control instruments are entering the field. These continuously analyze for a particular component or impurity in a plant stream or continuously measure a physical property which is an index of the quality of the product. Better plant operation justify these controls, he said.

Electrical controls in the manufacture of Fiberglas were covered by R. J. Paoletti, Owens-Corning Fiberglas Corp. Automatic controls provide corollary advantages in minimizing the human error element and decrease the number of personnel per operation, he said. An example is the method of handling glass batch raw materials all the way to the melting furnace. Resistance heating using 4,000 amp at 2.5 v maintains 2,500° on the bushings that form the fine glass fibers.

Answering the question "who is re-

DOWN IT GOES New 500-kva G-E standardized network transformer being lowered into vault on Snow Street, Providence, Rhode Island. Vault previously housed a standardized 300-kva unit.

Load growth in Providence easily met by network system

New 500-kva G-E network transformer nearly doubles the capacity at this location as it replaces a 300-kva unit . . . using the same vault and cable connections.

In city after city secondary networks continue to demonstrate their flexibility and economy for meeting today's load growth—on an orderly, step-by-step basis—without any rearrangement of secondaries or service entrances.

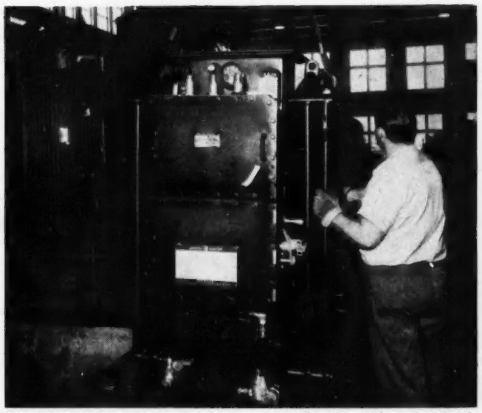
Providence, Rhode Island, provides a recent example. Load in the business district around Snow Street was climbing, due to increasing use of air conditioning, higher levels of illumination and general business expansion. Narragansett Electric, the utility, foresaw the need for additional capacity and simply ordered a new 500-kva General Electric standardized network transformer.

TRANSFORMER EASILY INSTALLED When the new unit arrived, it was placed in storage until actually needed. Then, utility crewmen removed the existing 300-kva unit and lowered the new 500-kva unit into the vault. It was tapped in on the secondary grid without interrupting service.

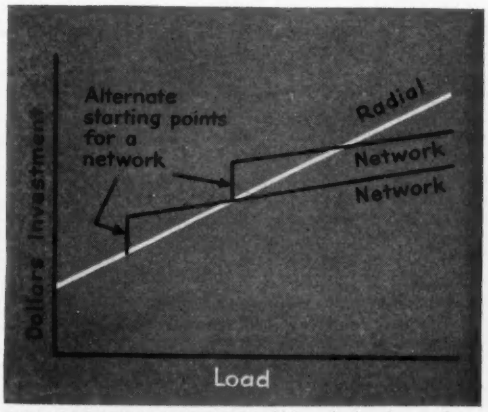
And that's all there was to it! Since both units were standard, no trouble was encountered in replacing the 300-kva unit with a 500-kva unit—the same vault and even the same cable connections were used!

HELP FOR YOUR SYSTEM If you're struggling to accommodate new loads by perpetuating a radial system and your load density has risen to approximately 10,000 to 15,000 kva per square mile, it may be time for you to investigate the flexibility and economy of a secondary network.

For help in solving your network problems and for complete information on the advantages of G-E standardized network units, see your local G-E Apparatus sales representative. Or write for Bulletins GEA-5024 and GEA-2017. General Electric Company, Schenectady 5, New York. 402-127



HELD IN STORAGE Narragansett Electric, Providence, Rhode Island, foresaw need for additional capacity and ordered new 500-kva unit which was held in storage until needed. With the new unit on hand, utility crewmen were able to schedule its installation well in advance.



IT PAYS TO START A NETWORK. Although the change from a radial to a network system means some initial expense, future increases in capacity require less investment with a network. And with a growing load, the sooner the network is started, the lower the ultimate cost.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Morong Groh

Clark Prof. Osburn

Goss Hunt

sponsible for safety," William Ismay, Arizona Public Service Co., said that it is the foreman. The company is responsible for providing the proper environment, he said, but in the final analysis responsibility for safety lies with the supervisory function — the foreman. He said that proper diagnosis of little accidents can prevent big ones —if we find ways of preventing the little accidents, the large ones will never occur.

Safety starts on the drawing board, said E. C. Hunt, Pacific Gas and Electric Co. The designing engineer contributes his share to safety by his knowledge of plant operation, Hunt said. He urged that the engineer and manufacturer pay more heed to safety when designing plants and equipment.

Floyd Goss, Los Angeles Department of Water & Power, gave an illustrated talk on safety practices in England. He said that practice varies widely from that in America and noted that steel towers are erected by workmen without safety belts; that pole switch structures are worked from scaffolds; that there is no hot-line work above 650 v; that high-voltage twin-circuit lines are identified at ground level and at circuit level by a symbol and that when a line is cleared for work, the lineman wears a wristband carrying this same symbol. The fundamental concept of safety in England is so different from ours, said Goss, that comparisons and evaluation are difficult to make.

Electrical work injuries in California was the subject of a paper by E. E. Carlton of the division of industrial safety of California. He said that one fact emerges with startling clarity from a study of accident figures —the continued high ratio of deaths to electrical work injuries, compared with the ratio of deaths to all work injuries. We must keep on emphasizing the need for eternal vigilance in following safe practices and in guarding against performing an unsafe act, he said. The remedy lies in observance and application of time-tested safety rules and practices.

Western Mining Applications

Six papers dealt with this subject. M. C. Potter, Westinghouse, said that the trend in open-pit ore haulage is to the use of diesel-electric locomotives in place of storage battery locomotives and cited the operation of 16 of the diesel-electrics at Phelps Dodge's Morenci, Ariz., operation. Modification and refinements of the dynamic braking control system make possible a wider use of this system on mining-type locomotives. As a result, safer and more economical operation of mine haulage systems is achieved, stated A. B. Chafetz, International Minerals & Chemical Corp., R. D. Call and B. E. Rector, Westinghouse, and Felix Berra, Phelps Dodge, in their paper on electric braking systems for mining locomotives.

Other papers were: portable underground dry-type power centers; the Idaho phosphorus industry, its effect on Snake River hydro developments; and a-c distribution in open-pit copper mines.

President Quarles explains to a 14-year-old Phoenix lad, Ray A. Jones Jr., how he may become an electrical engineer. The boy saw Quarles and other AIEE notables on a TV interview during convention and went to the hotel to look up the AIEE president and to talk it over with him

Transformers

Discussing local conditions affecting loading of standard 55 C transformers, F. L. Roe and L. F. Simons, Salt River Power District, and K. V. Fletcher, G-E, concluded after thorough investigation that, for local conditions of loading during periods of abnormal ambient temperatures, a standard 55 C rise oil-immersed self-cooled transformer is somewhat overrated and its life expectancy may be less than normal. Evaporative coolers, sun shades and light-colored paint are expedients being resorted to, said the authors. The attention of transformer design engineers should be solicited in the interest of applying, in the least unattractive way, such additions to the transformer, they feel.

S. A. Moore and W. J. Grasmoen, Salt River Power District, discussed the effects of solar radiation on transformer cooling. Transformers reach a temperature of 170 F without load in the area, they said. A sun shade to keep off direct sun rays has given promising results. This is a louvered structure that permits free circulation of air and provides 100% shade from 8 a.m. to 4 p.m.

A thermal relay of proper characteristics would permit full use of the available power transformer overload capacity, stated W. L. Carey, Portland General Electric Co. To make the thermal relay more flexible there should be some means of changing its characteristics, he said. At least it should be possible to adjust the contact closing temperatures of the relay contacts. An indicating device connected to the heat-sensitive element to indicate its temperature would be useful. Carey feels that in unattended substations the use of the thermal relay for feeder breaking tripping is highly desirable.

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Professor Fred O. McMillan, right, immediate past president, is presented with a radio by Titus LeClair, the junior past president, on behalf of the board of directors

Metering and Relaying

A device for recording circuit breaker operation instantly as well as permanently for the information of system operators was described by H. A. Holmes, consulting engineer, Prescott, Ariz. The instrument embodies a continuous record chart driven by a synchronous motor. Stylii are mounted above the chart, one stylus for each breaker and one for each relay group. Only one instrument has been built to date but Holmes feels that such a device fills a long-felt need of system operators.

A wide-range frequency recorder and indicator for electric system use was described in a paper by the late F. S. Benson, Pacific Gas and Electric Co., and R. M. Stuart, G-E. The recorder uses a frequency measuring system having a scale range of 20 to 70 cps and is used at the Moss Landing and Contra Costa steam plants of PG and E to give a permanent record and accurate picture of generator frequency during faulty conditions. This is invaluable in analyzing the fault.

Industrial Power Systems

Advantages of a secondary network for providing continuity in the new plant of Lever Bros. in Los Angeles were discussed by Walter Hahn, Bechtel Corp., and P. Belsky, Westinghouse. Six 1,000-kva load centers networked on the 480-v secondary side permitted taking full advantage of plant diversity and offered the highest degree of continuity of service of systems considered.

Power supply for nuclear research laboratories was discussed by Carl Graver, University of California. In nuclear research work a very flexible power system having a wide range of voltage and current levels is needed, he said. Major problems are protection against radiation and safeguarding personnel with elaborate interlocks.

The very definite trend to the grounded neutral system for industrial plants was noted by F. M. Dorey, G-E. The 480-v wye transformer is now a listed standard load center with many manufacturers and is suitable for universal service, grounded or ungrounded, he said. Proper grounding pays dividends and the problem now is one of education to overcome the inertia of years of ungrounded system experience, Dorey said.

Microwave Applications

Carrier current tests on a 110-kv loop, microwaves in the power field, and carrier current operation and maintenance were covered in this session. Application of carrier to a 26-mile section of 25-cycle, 110-kv line for automatic remote control of Mormon Flat hydro plant was discussed by S. M. Chalmers and F. W. Reece, Salt River Power District.

Otto Mangum, USBR, after describing the carrier current facilities on the Parker-Davis power system offered the observation that there is an apparent scarcity of literature dealing with operation and maintenance problems, procedures and practices relative to the use of carrier current, radio and microwave communication equipment and other electronic apparatus.

System Engineering

The Davis Dam power plant was described by S. M. Denton and H. O. Britt, USBR, and the Parker-Davis power system by W. M. Doak, USBR. J. L. Blackburn, Westinghouse, gave a paper on the influence of power system design on protective relaying. He covered the philosophy of relaying and basic applications, pointing out that system design is influenced by relaying and vice versa and said that this close association is being recognized by including the relay engineer in system planning.

Power Generation

The Cross Cut steam plant of the Salt River Power District was used to trace 40 years of progress in power plant design, culminating in the new and ultramodern outdoor Kyrene plant of the same utility. The extent to which various components of the plant could be exposed to the elements was determined by balancing the first, operating, and maintenance costs as they were affected by the local weather conditions.

Inner-cooling of windings as a means of increasing capacity of large turbine-generators was discussed by L. A. Kilgore, Westinghouse. He said that we have reached practical limits in capacity of 3,600-rpm generators at about 250,000 kva but, with inner-cooling, machines of 319,445 kva are now being built. Inner-cooling is described as the direct cooling of the copper by passing the gas directly through the conductors.

H. A. Langston, Westinghouse, said that the gas turbine has the greatest promise in improvement of any heat engine. Its quick starting makes it ideally suited for peak loads and stand-by service with no losses during stand-by, and with low installation cost and little or no cooling water required, it is an attractive prime mover in present sizes ranging up to 15,000 kw and 20,000 kw.

Electrical techniques in medicine and biology under the science and electronics division of the institute was new to the agenda of Pacific general meetings. The session attracted a number of physiotherapists and M. D.'s from the West Coast. One paper dealt with the behavior of single cells in the brain at rest and under the stimuli of application of electrical potentials. Other subjects were: use of sensitive instruments to study swelling of extremities; conceptual approach to the study of electric oscillations and their effect on brain cells in animals; an analysis of the reasons for the stoppage of heart action and ways and means of preventing stoppages; cardiac defibrillation by single condenser discharge; and visualization of the distribution of gamma ray emitting isotopes in the human body.

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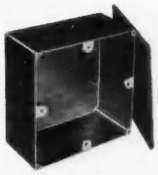
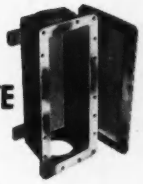
cast iron boxes like our types YS  and YE 

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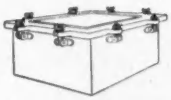
to completed box 

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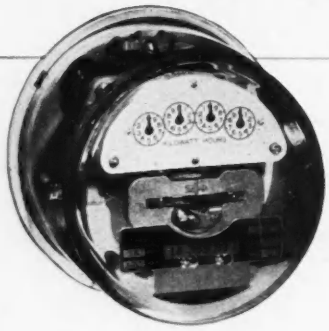

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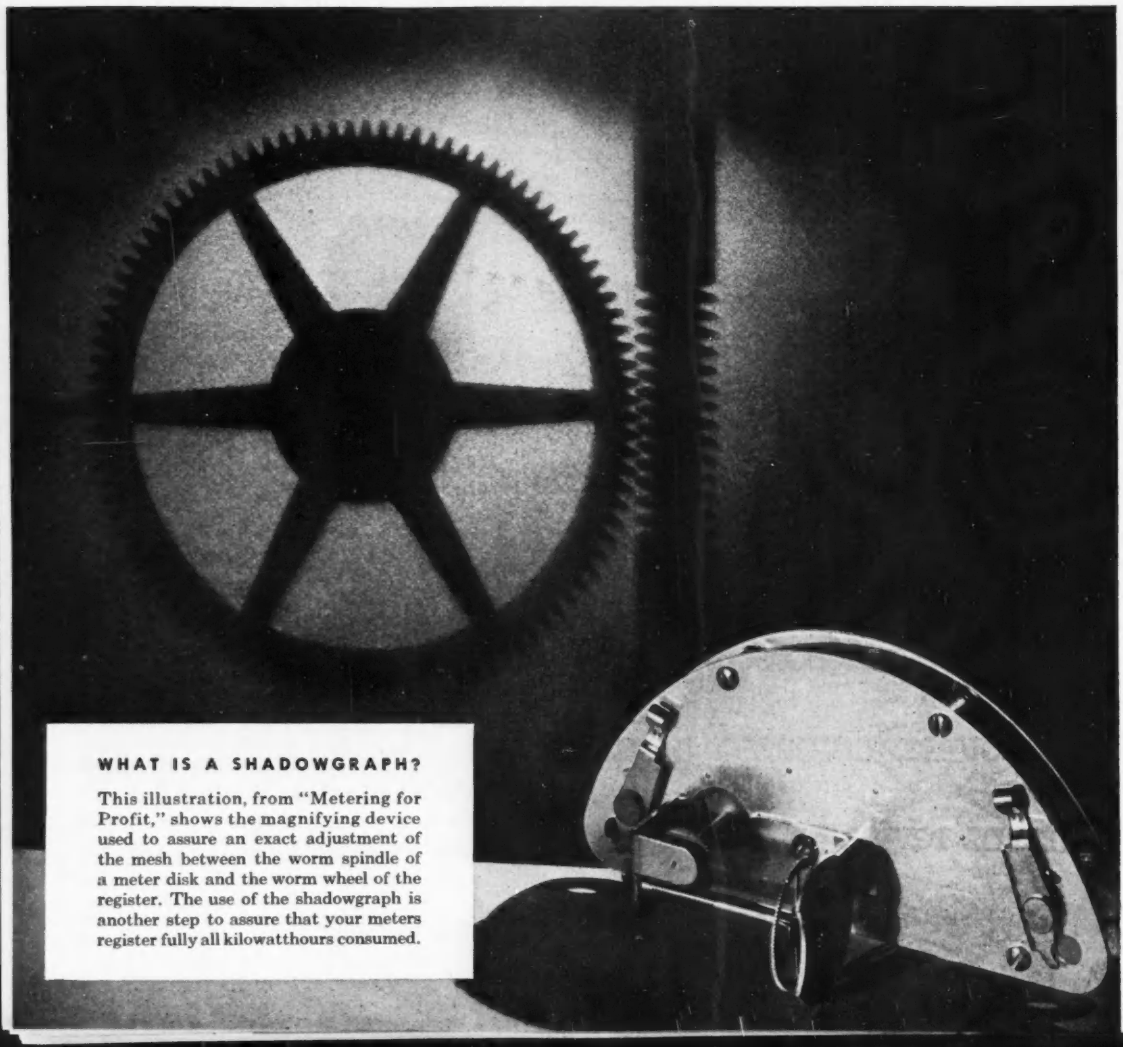
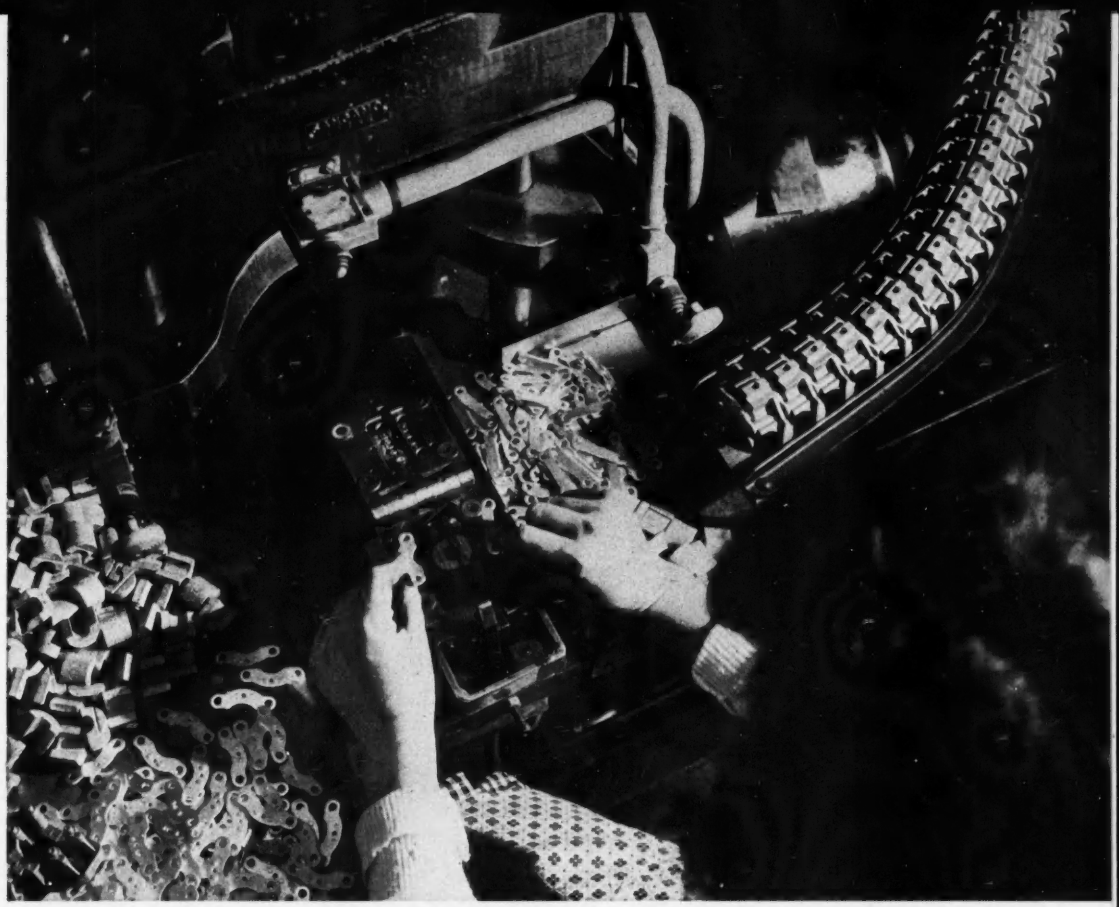


WHAT IS A SHADOWGRAPH?

This illustration, from "Metering for Profit," shows the magnifying device used to assure an exact adjustment of the mesh between the worm spindle of a meter disk and the worm wheel of the register. The use of the shadowgraph is another step to assure that your meters register fully all kilowatthours consumed.



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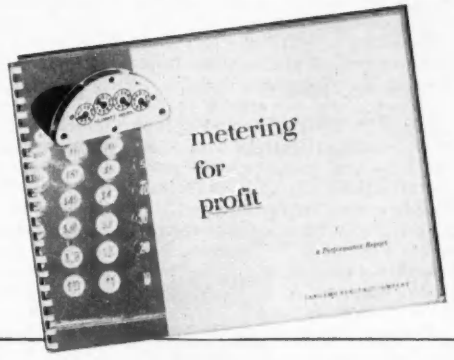

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SM52-10

Quick Catch-up

Contractors

John Grumey, Coast Electric Co., Vancouver, B. C., was elected president of the **Vancouver Electrical Assn.**, the electrical contractors organization in British Columbia; S. C. Markin, vice-president; Thomas Bymondson, secretary; Leonard Sewell, treasurer.

Electrical contractors' associations on Vancouver Island held a joint regional conference at Nanaimo recently. Speakers included Charles W. Nash, district manager, B. C. Power Commission, Nanaimo; S. E. Jarvis, Vancouver Island manager of the Electrical Service League; R. G. Taylor; Lance Robson, electrical inspector for B. C.; R. Hall, Electrical Service League; R. R. Rathlef, president of the association; J. G. McKeachie, public relations officer, B. C. Power Commission; George Bailey, president of Alberni District association.

NECA

Utah-Idaho Chapter held a special meeting at Idaho Falls to discuss the future of the chapter in its relationship to a possible chapter in Idaho. A discussion of finances and potential membership resulted in a recommendation that chapter dues be raised to 1½% of labor pay roll in order to engage an assistant manager for Idaho to help Manager Howarth, who has been recovering from illness. A special meeting in Salt Lake City Aug. 25 was scheduled to discuss the Boise-Twin Falls contractors inclusion in the chapter and the general chapter situation. At a recent annual election W. P. Robbins, Central Electric Co., Salt Lake City, was re-elected president; Charles I. Berrell Jr. of Howard P. Foley Co., vice-president; L. A. Herdti, Ogden Electric Co., treasurer; and as directors L. A. Thomson, P. A. Maughan, LeRoy Strand, E. E. Oberg, N. W. Forsberg, A. R. Woolley and R. W. Bauchman.

Montana Chapter's board of directors authorized the expenditure necessary to write an electric licensing law for Montana, to be presented to the next legislative session in 1953. E. W. Toomey of Helena was engaged to write the law. Myron Staves, The Electrical Shop, Missoula, was elected to represent the Missoula division on the board of the chapter. Next meeting is to be held in Butte Sept. 20, according to Bill Blackmar Jr., manager.

Northern California Chapter—Enrollments for an estimating course, the second course in the series prepared by NECA, are being received and the Northern California Chapter will start its classes in mid-September at Merritt Business School. The classes will run on Tuesday evenings, beginning Sept. 16. Henry M. Tilson, electrical engineer, partner in the firm of Beamer and Tilson, will be the instructor using the course material prepared under the direction of E. R. Cornish at Washington, D. C. The Northern California Chapter recently granted certificates to 25 people who completed the accounting course. By mid-August there had been over 15 enrolled in the estimating course. A similar number, it was reported, had signed up for a course in San Francisco, offered by the San Francisco Electrical Contractors Assn., a chapter of NECA.

The National Electrical Contractors convention from Oct. 6-10 will be followed by a post-convention tour to Sun Valley. A special train will leave Chicago Oct. 10 for the trip. Theme of the convention is "Management Responsibility." It will be held at the Morrison Hotel in Chicago.

IAEI

C. M. Kirsop, chief electrical inspector, Olympia, Wash., this year is International president of IAEI and the **Northwestern Section** will start the series of section meetings at which he will attend, accompanied by Charles L. Smith, secretary-treasurer from Chicago. The Northwestern Section annual meeting will be at Twin Falls, Idaho, Sept. 11-13.

The Southwestern Section meeting will follow on Sept. 18-20 at Californian Hotel in Fresno. The tentative program lists a good deal of time for code discussion, a talk on equipment identification by O. G. Wedekind of Underwriters' Laboratories, San Francisco, one on the value of the electrical inspector by Loren S. Bush, chief engineer, Board of Fire Underwriters of the Pacific, San Francisco, and a talk and demonstration of standard electrical service entrance sections adopted by the Pacific Utilities Electric Service Requirements Coordinating Committee and presented by Merle Plummer, Department of Water & Power, Los Angeles. Eustace C. Soares, Industrial Engineering Services, New York, will speak on grounding in industrial plants. R. D. Johansen, chief electrical inspector, Alameda, will preside as president of the section.

Southern California Chapter is preparing a committee report on grounding, which will be printed and distributed throughout the area. It will contain diagrams and specifications for acceptable grounding methods. Considerable discussion was had over the abridged version of the National Electrical Code. The chapter also requested that the section hold a meeting in 1953 prior to the Chicago national convention of IAEI. Next meeting of the chapter will be at Compton, Nov. 19. L. E. LaFehr, chairman, presided.

Puget Sound Chapter, International Association of Electrical Inspectors, will submit proposed changes to the code Sections 4344 and 4346 on fuseholder sizes, also on pendent switches used on hoisting equipment, and on the disputed derating of switches at the Northwest Section annual meeting, it voted at its Aug. 23 meeting in Seattle.

P & K

Tacoma, Wash., was granted a charter for membership in the Pot & Kettle Clubs at the recent annual convention of the associated Pot & Kettle Clubs of America at Troutdale in the Pines in Colorado. Officers elected were B. J. Badham Jr., Hoffman Hardware, Los Angeles, president; Allen T. Myers, agent, Seattle, vice-president; Carl Hobson, Harper Reynolds Co., Los Angeles, treasurer; Ted Maroney, Glen B. White & Associates, Los Angeles, secretary; Gould Heyer, South West Hardware Co., Los Angeles, publicity director; Lester Nedlett, Los Angeles Ladder Co., historian. Charles G. Putnam, San Francisco, retired from the supreme council and the new chairman is James P. Cummings, Seattle. Regional vice-presidents elected are: Portland, Lowell O'Connor; Los Angeles, Arthur Hitt; Seattle, Sam Maizel; Salt Lake City, C. Carl Adair; San Francisco, Ernest Hapholdt; Spokane, Jack Berger; Denver, Harold Kueker; Tacoma, Dave Johnson.

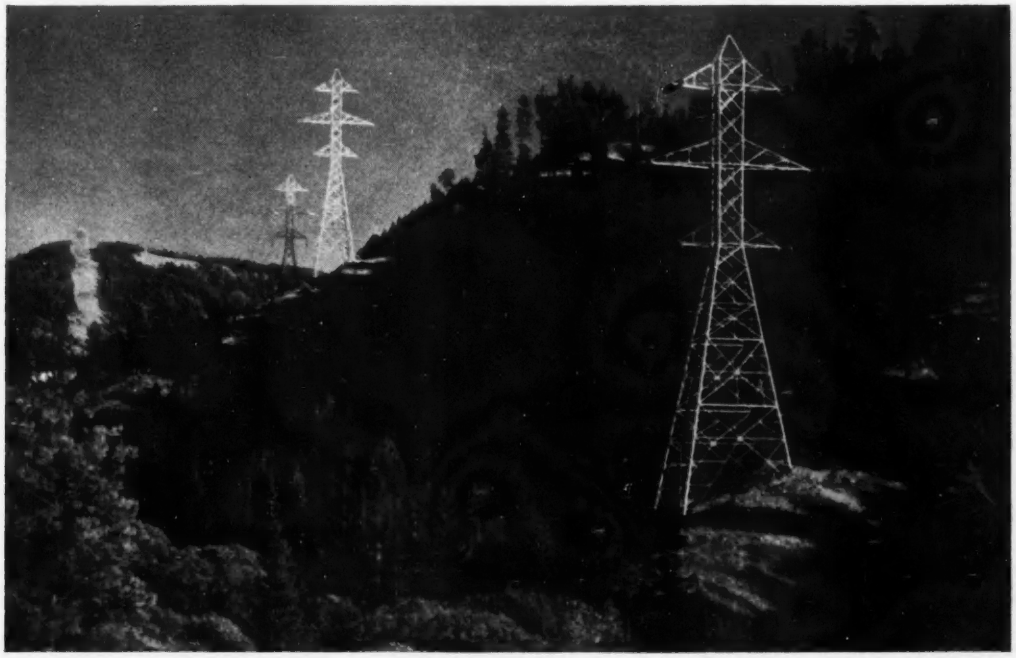
Rod Adams of M. Seller & Co. has been elected president of the **San Francisco Pot & Kettle Club.** Griff MacDonald, Allied Western Distributors, is vice-president.

EHA

Electrical Heating Assn. of British Columbia elected Ray Counter as its president, succeeding Dave Brousson. James Ball is vice-president, Svend Blangsted secretary, Charles Larkin treasurer.

POWER

from Chief Joseph to Puget Sound



The Foster Creek-Snohomish line carries hydro-electric power some 140 miles from Chief Joseph Dam to several communities located in the northern Puget Sound area. This line is carried on 456 double-circuit 230 KV galvanized steel towers. The job of detailing and fabricating these towers for the Bonneville Power Administration was handled by Bethlehem Pacific.

Specializing in this field Bethlehem Pacific operates two complete fabricating works that fabricate steel for transmission towers and bus structures. One is located in Seattle and the other is in South San Francisco. Both are equipped to shear, punch, drill, form and galvanize tower components on a production line basis.

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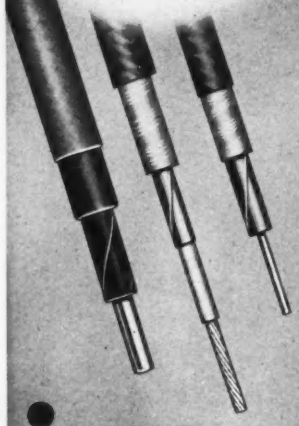

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Electric Clubs

San Diego Electric Club is the only one that continues meetings during the summer. Duke Marston of General Electric Co. presented the film, "The Inner Man Steps Out," by G-E at the Aug. 5 meeting and Bob Kinslow of Westinghouse a color movie, "Better Than Kings," on Aug. 19.

Vancouver Electric Club elected J. E. Underhill as its president and H. G. Ashbee vice-president, H. A. Bulmer secretary, and A. W. Gladstone treasurer.

IEEL

After electing as permanent officers those previously selected as temporary directors, the **Inland Empire Electrical League** selected chairmen of its three sections. Russell Williams is chairman and Glen Waugh vice-chairman of the appliances section; Carl Hoffman is chairman of the supply and apparatus section with Henry Vincent as vice-chairman; Leonard Albert is chairman of the radio-television section with A. E. Brown vice-chairman. Robert Wilkinson is managing director of the organization.

NISA

Puget Sound Chapter of National Industrial Service Assn. elected Earl S. Brooks, United Electric Motors Inc. of Seattle, as its chairman and J. Calvin DeVere, Motor Shop, Kirkland, Wash., as secretary-treasurer.

San Diego Chapter elected John H. Lough as its president, Ted F. Clute, vice-president, and R. L. Pontius as secretary-treasurer.

NAED

Annual fall meeting of the **Pacific Zone** National Association of Electrical Distributors will be held at Hotel Del Coronado, Calif., Oct. 6-8. R. A. Balzari, secretary, is taking reservations. One of the features of the program will be a talk by B. A. Graham, president of Sunbeam Corp., on the new Fair Trade law.

IAEL

An effort will be made to bring the next annual meeting of the International Association of Electrical Leagues to California when the annual meeting is held at Minneapolis Oct. 1-4. J. Clark Chamberlain, Bureau of Home Appliances of San Diego County, is scheduled to speak on the establishment of an electrical contractors division and Victor W. Hartley, Pacific Coast Electrical Assn., of workshops and electric living centers.

As the Electric Club season starts again, John M. Nelson, assistant superintendent of Seattle City Light becomes president of the Electric Club of Washington. Here he was crowned by his predecessor, H. R. Loew of the General Electric Co., Seattle

EMEA

A meeting of Electrical Maintenance Engineers Assn. of southern California sponsoring member representatives and past exhibitors to decide the advisability of holding an industrial electrical show in 1953 concluded recently that it would be better to hold over until 1954, probably in March, for another show. Material and manpower shortages were given as the reasons. The Sept. 17 meeting of the EMEA was scheduled to be bosses' night with a special "House of Magic" program as sponsored by General Electric Co.

IES

The national technical conference of the Illuminating Engineering Society was to be held in Chicago at the Edgewater Beach Hotel Sept. 8-12. D. M. Finch, University of California, is on the program for a paper on "Pavement Brightness Measurements."

Northern California Section had scheduled a visit to the new Emporium at Stonestown on Sept. 10, for a field study of merchandising with light.

Officers elected for the various Western sections of IES who take office in September are as follows:

British Columbia Section — Paul Donnell, Northern Electric Co. Ltd., Vancouver, chairman; D. S. Gordon,

B. C. Electric Railway Co. Ltd., Vancouver, secretary.

Northern California Section—Robert W. Thunen, Sylvania Electric Products Inc., Emeryville, chairman; Mrs. Beth Perry, Charles A. Von Bergen, San Francisco, vice-chairman; James E. Barnes, Pacific Gas and Electric Co., San Rafael, secretary-treasurer.

Oregon Section—Ray W. Preston, Portland, chairman; Frank M. Reis, Pacific Power & Light Co., Portland, vice-chairman; Marvin S. Prestwood Jr., Portland General Electric Co., Portland, secretary-treasurer.

Puget Sound Section—C. A. Scheyer, Puget Sound Power & Light Co., Seattle, chairman; G. D. King, Sylvania Electric Products Inc., Seattle, secretary.

Rocky Mountain Section—Ferman Bischofberger, Public Service Co. of Colorado, Denver, chairman; Arthur F. Weers, Weers Electrical Planning Service, Denver, vice-chairman; Carl W. Strain, General Electric Co., Denver, secretary-treasurer.

Southern California Section—Roy E. Dahlin, Southern California Edison Co. Ltd., Los Angeles, chairman; Donald W. Prideaux, General Electric Co., Los Angeles, secretary.

Engineers Centennial

Herbert Hoover was awarded a gold medal naming him "engineer of the century" at the Northwest Engineers Centennial sponsored by the Professional Engineers of Oregon Aug. 9 in Portland. More than 600 attended.

In his talk, the ex-President warned of a serious shortage of technically trained men. Partial remedy for our ills is to stimulate scientific discovery, invention and their application by our engineers, he said, thus increasing productivity per capita. He added that he did not guarantee that it would work fast enough to save our American way of life but it could help.

Col. T. H. Lipscomb, district Army engineer, reviewed a century of power in the Pacific Northwest and Wilfred E. Johnson, general manager of the G-E nucleonics division, spoke on social and political impact of the atomic industry. Other speakers were: Stanley A. Easton, president of Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho; J. M. White, president, Long-Bell Lumber Co., Longview, Wash.; John D. Coleman, president of the National Society of Professional Engineers, Dayton, Ohio; Tully C. Knoles, chancellor, College of the Pacific, Stockton, Calif.

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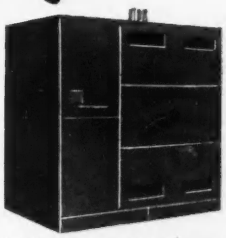

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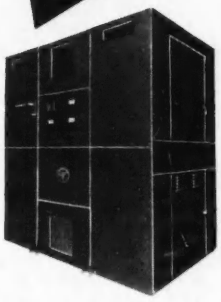

1500 KVA, Type F Unit Substation, 4800 V Delta 60 Cy, 3 Ø—120/208Y, 4 wire.

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ARE ECONOMICAL — Lower cost installation and operation, negligible maintenance.

For the transformer that's second to none, specify MARCUS.

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PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS

THE MONTH IN BRIEF

And Now There Are Six

With Whatcom County PUD apparently out of the deal, new plans for purchase of Puget Sound P&L properties by the six remaining PUDs were being drawn up last month. Friction between the Whatcom commissioners and others in the seven-district proposal reached a climax when the Whatcom board retained W. C. Gilman & Co. to study the plan. Neither Puget Power nor Guy C. Myers, fiscal agent for the districts, would give the Gilman firm access to records. Frank McLaughlin, Puget Power president, said he denied Gilman access to Whatcom County property records because the firm had been employed by the company in 1940 condemnation proceedings and he considered its employment by the PUD unethical. He further declared that company policy had been against giving out information that could be used by districts in piecemeal condemnation. Whatcom commissioners denied that they were contemplating condemnation of the county properties, insisted they wanted only the facts, which they said had been denied them heretofore. To the commissioners' argument that the district is being asked to pay $15 million for properties valued at only $5 million in 1940, McLaughlin replied that appraisals of 12 years ago are unrealistic with today's depreciated dollars and that the commissioners seem to be overlooking Puget's expansion since 1940.

Bakersfield Power Restored in 40 Minutes

The 6.1 intensity earthquake that damaged many buildings in Bakersfield, Calif., had little effect on power facilities. Service was restored to virtually every customer in the area within 40 minutes by Pacific Gas and Electric Co. crews. Most serious damage to utility structures was to PG and E's downtown office. This building, constructed principally of brick, was abandoned and offices were moved to a temporary location in the employees' association clubhouse. New offices will be built later.

PG and E Asked to Wheel Power

USBR has asked Pacific Gas and Electric Co. to deliver CVP power to the Sacramento MUD and four other potential preference customers. PG and E and the government have a 10-year contract providing for transmission of the power over company lines but the question of whether the bureau may sign PG and E customers has not been decided. With 90 days to consider, the company had not answered the request at press time. It did, however, agree to wheel power to the Provident Irrigation District, one of the five. The district had a 30-day cancellation contract with the company and had recently signed a 10-year contract with the bureau.

Utilities Board Proposed at Tacoma

Proposed new charter for Tacoma would establish a public utilities board to direct City Light as well as the water department and Belt Line Railroad. The board (recommended by the Chamber of Commerce Industrial Bureau) would be independent of the city manager who would direct other departments. A single elected commissioner now directs the light and water division and the railroad. The proposed charter has been approved by a Freeholders Committee; still has to be approved by the voters.

Private Financing Studied for Bridge Canyon

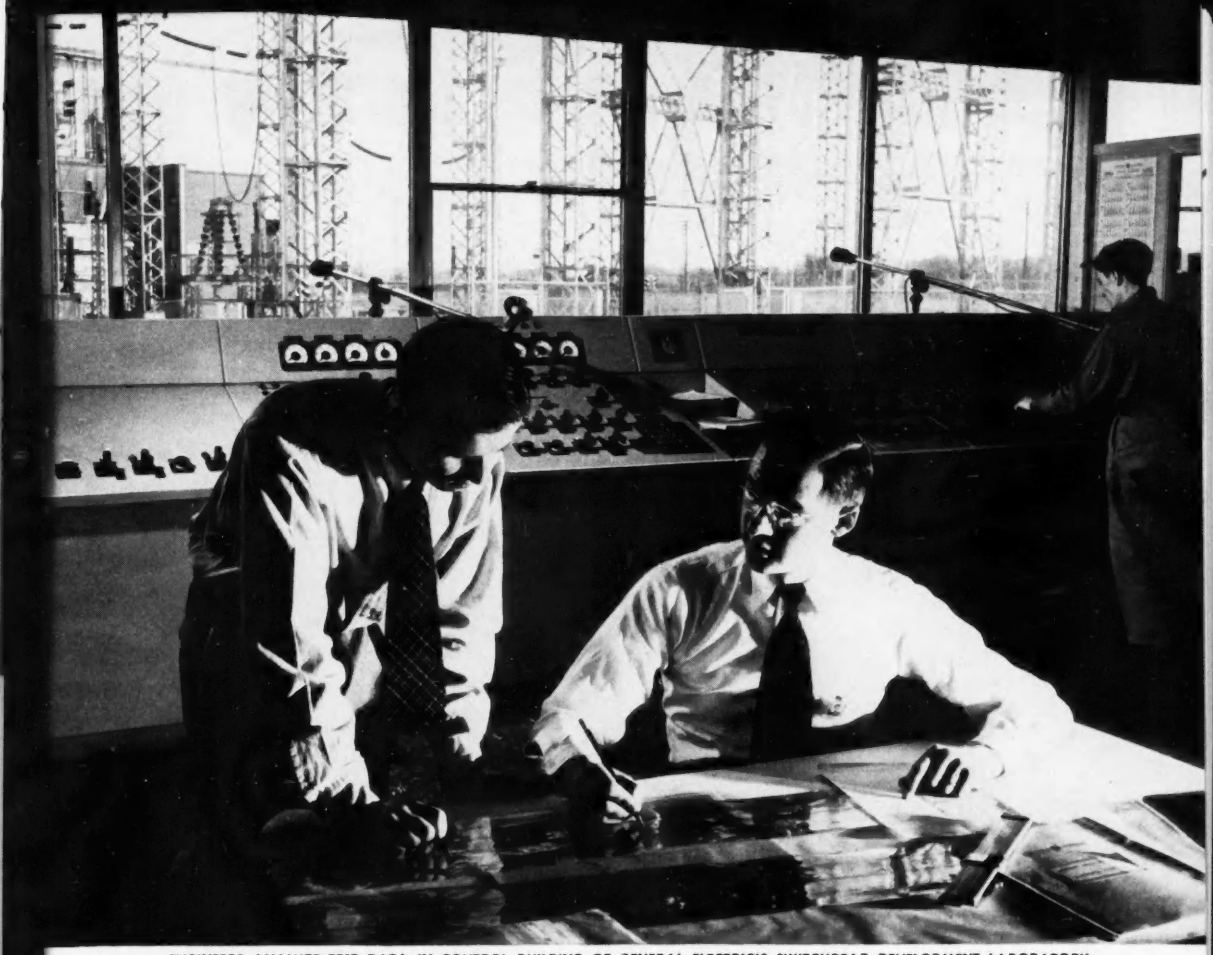
Arizona is studying the possibility of private financing for the $270 million Bridge Canyon Dam on the Colorado, key structure in the Central Arizona Project. Howard J. Smith, executive secretary of the Central Arizona Project Assn., said the group had not investigated private or state financing sufficiently to come to any conclusion but that every opportunity to build the dam will be examined. Smith's statement followed announcement by Secretary of Interior Chapman that Arizona had been granted a right-of-way across public lands on which the aqueduct would be built. Arizona has tried since 1947 to get congressional approval for the development. The Central Arizona Project, which would cost $788 million, has twice been approved by the Senate; has been stopped in the House committee.

Contracts Let on Box Canyon Dam

Construction was scheduled to begin last month on the $16 million Box Canyon Dam near Newport, Wash., for the Pend Oreille County PUD. The general contract has been awarded to the Pacific Bridge Co., General Construction Co. and Shea Construction Co. for $7,721,389, while turbines will be provided by Allis-Chalmers. Ultimate capacity will be 66,000 kw. The first generator is expected to be on the line in the fall of 1954. The PUD plans to use about 18% of the power and sell the rest to other distributors. It has sold a $17.5 million bond issue to the RFC at 4% interest for a retirement period of 35 years.

Utah Power & Light Granted Rate Increase

A rate schedule that will give Utah Power & Light Co. an added $383,000 in net profits annually and bring its earnings to $824,000 before taxes has been approved by the Utah PSC. The new schedule is applicable only in Utah service areas. Residential users will pay $327,000 of the increase. The over-all average is 4.4% but customers in Salt Lake City and Ogden will pay 2% more, which is to go to the respective municipal governments in the form of a gross receipts tax on franchises. Municipal franchise taxes are to be filed separately on customer statements as is done with Utah's 2% sales tax. Formerly municipal taxes, which totaled some $178,500 in 1951, were included in the general rate structure shared by all power users in the state. The commission found the utility entitled to the rate increase to bring its earnings up to standard. A company request for an escalator clause permitting automatic adjustments in rates compensating for coal price increases was denied.



ENGINEERS ANALYZE TEST DATA IN CONTROL BUILDING OF GENERAL ELECTRIC'S SWITCHGEAR DEVELOPMENT LABORATORY

Multimillion KVA "Fact-Finder" points way for the power industry's rapid expansion

New Switchgear Development Laboratory has world's highest capacity testing facilities

At their new Switchgear Development Laboratory at Philadelphia, General Electric engineers are superbly equipped to get vital new facts on switchgear performance. The laboratory is a multimillion kva "fact-finder" that will speed the development of switchgear able to safely harness and control the tremendously greater power needs of tomorrow.

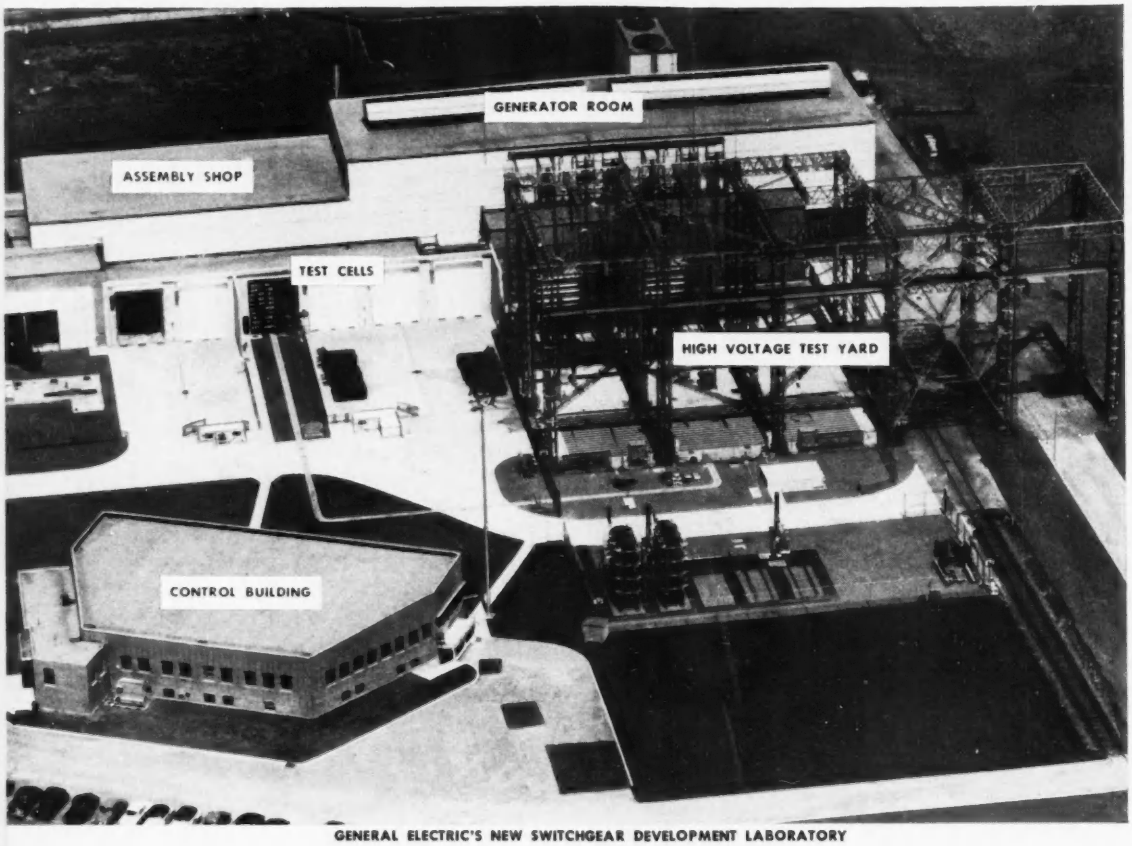
G-E development engineers—who have already made over 300,000 proof tests of switchgear since 1921, at previous G-E test laboratories—are enthusiastic about their new laboratory for two main reasons:

First, they can make more searching tests than ever before possible—with a short-circuit capacity of 5,250,000 kva asymmetrical, 3,200,000 kva symmetrical, three-phase, at 15.5 kv.

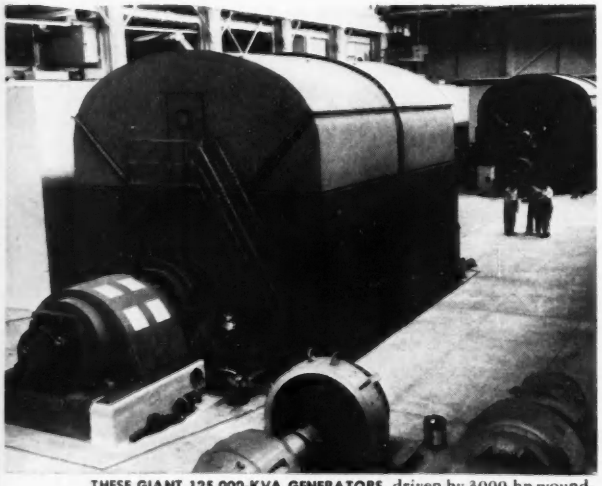
Second, they can now make tests at a much faster tempo. Testing procedures, formerly time-consuming and even laborious, are run off on a precise, fast-moving basis with the help of electrical and mechanical aids. As one G-E engineer remarked, "By clipping minutes off routine steps all day, every day, we can help clip months off major switchgear developments." 859-17

GENERAL ELECTRIC

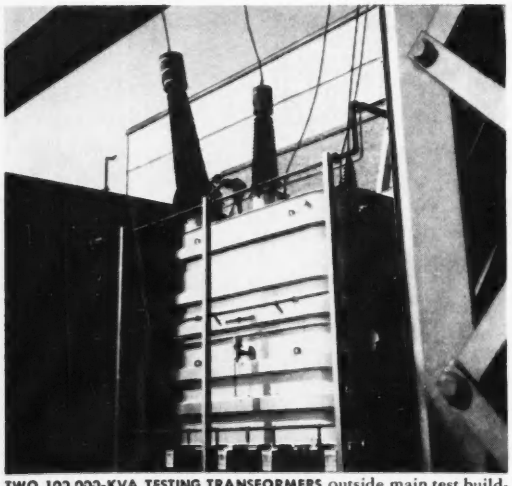
New G-E Development Laboratory gets



GENERAL ELECTRIC'S NEW SWITCHGEAR DEVELOPMENT LABORATORY

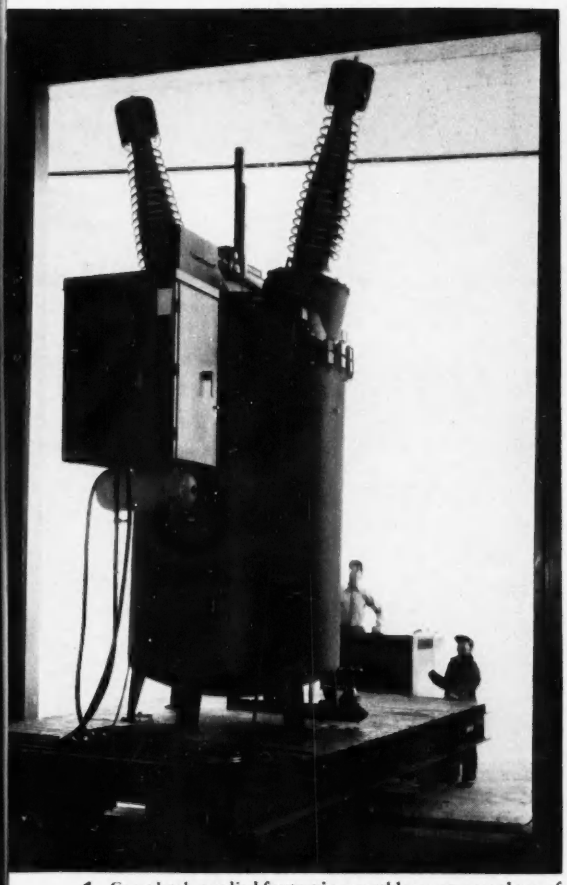


THESE GIANT 125,000-KVA GENERATORS, driven by 3000-hp wound-rotor induction motors, are the largest generators that have yet been built for short-circuit testing.



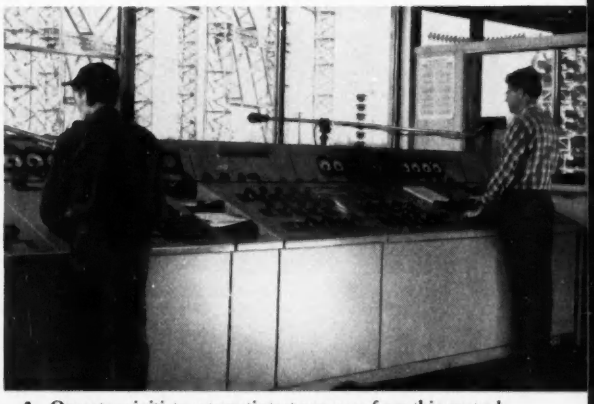
TWO 100,000-KVA TESTING TRANSFORMERS outside main test building step up 15.5-kv power from generators to give voltages as high as 440,000 for high-voltage tests.

new facts on switchgear performance

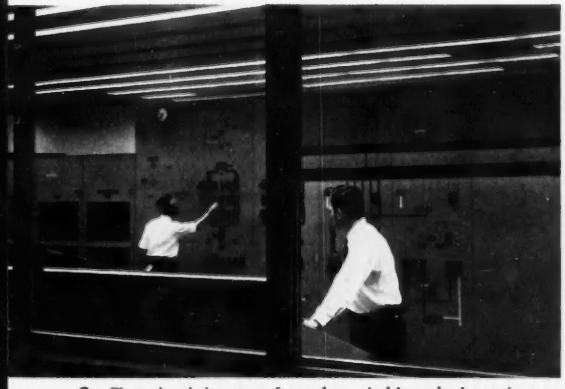


1 Completely readied for test in assembly room, one phase of a power breaker goes to the high-voltage yard where, minutes later, it will be connected and the test completed.

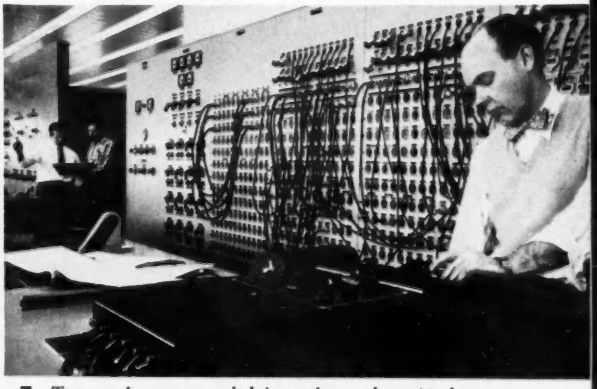
3 Operator establishes sequence and timing of all steps of the test on this selector panel. Closing of the test circuit is accurately timed to within 5 electrical degrees.



4 Operators initiate automatic test sequence from this control benchboard, after checking all safeguards, giving final warning signal and adjusting the generator voltage.

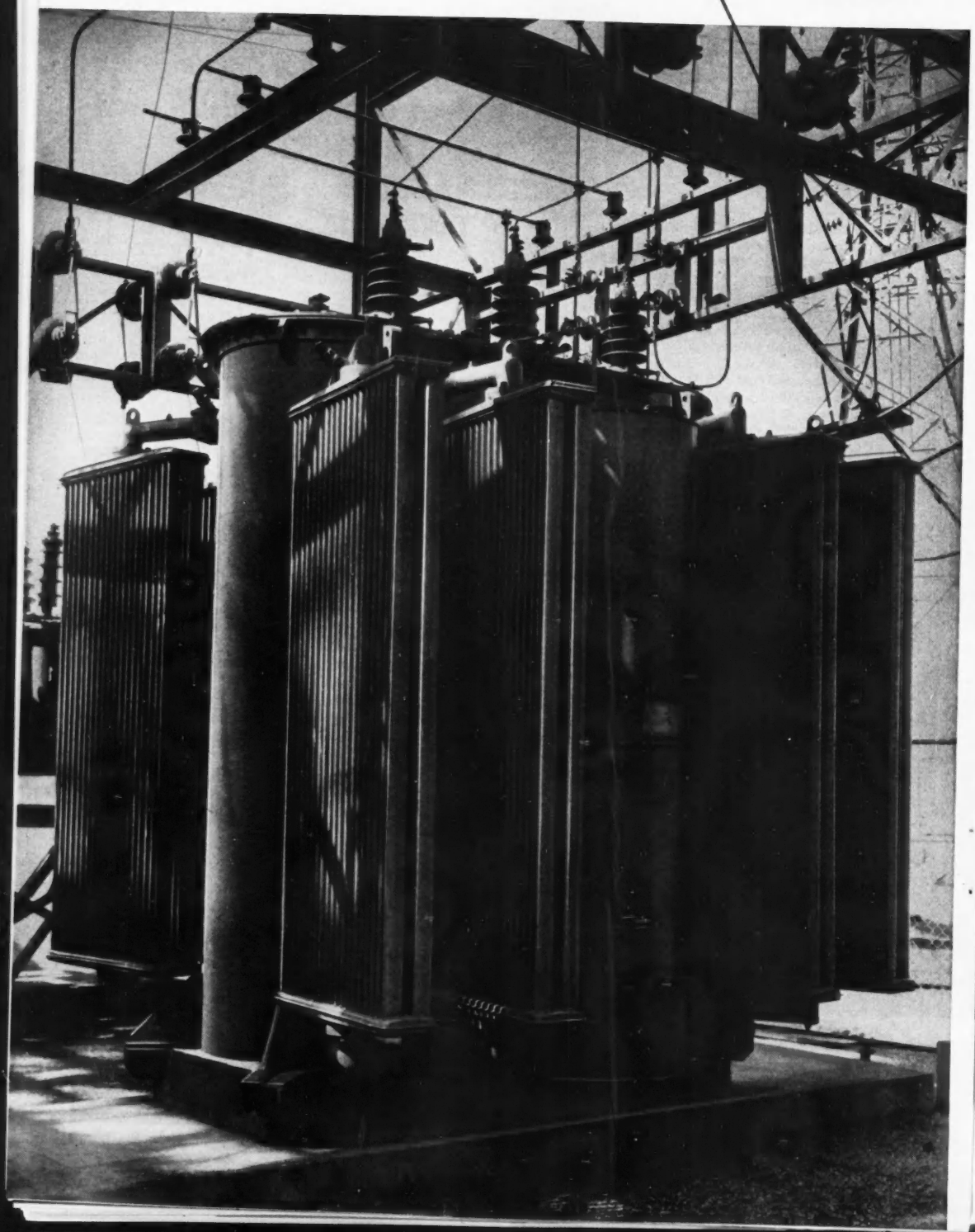


2 Test circuit is set up from the switchboard, above, in control building. Circuit diagram, with indicating lights, enables operator to visualize the entire test circuit.



5 Test results are recorded instantly on these 11-element magnetic oscillographs in control building. Plug board connects oscillographs to appropriate measuring devices.

more



power for Illinois industry

Production in a large Illinois steel and wire plant gets a mighty boost from the power supplied by the substation in which this 3750 KVA three phase Kuhlman transformer is located.

The Illinois utility which selected this Kuhlman Power Transformer for this substation job is one of 15 of the country's largest power companies. Kuhlman is proud of the fact that more than two thirds of these fifteen companies are numbered among its regular customers.

Kuhlman hasn't gained the trust of such companies by accident. It has held its position only because the quality workmanship and solid construction principles which it began building into its transformers 58 years ago have continued to measure up. These are good reasons why you, too, can count on the reliability of Kuhlman Transformers. For your next transformer requirement, give the Kuhlman representative in your area a call.

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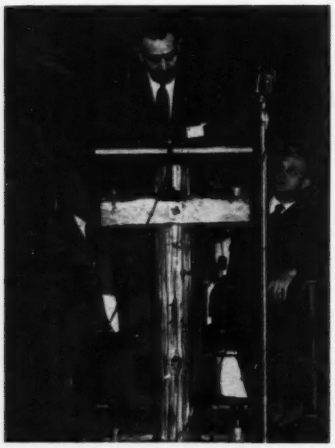
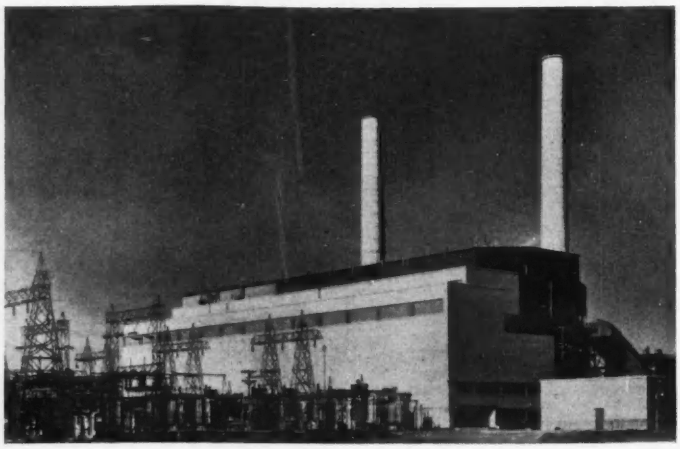
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

The complete Kuhlman line covers power, distribution, dry type, Saf-T-Kuhl and specialty units. Write today for descriptive bulletins.

EXPORT REPRESENTATIVES: *International Standard Electric Corporation,* 67 Broad Street, New York 4, N.Y. Cable Address, Microphone, N.Y.





"More Power for a Growing Colorado" was the theme of the dedication ceremony for Public Service Co. of Colorado's 132-000-kw Arapahoe steam-electric station, shown at right. In his dedication address, President John E. Loiseau, left, told of the company's future expansion plans, which include installation of a 100,000-kw generating unit by 1955. He pointed out that the $23 million station represented but one-fourth of the amount spent for expansion since the end of World War II, and that current and planned construction in the next five years would amount to more than $100 million. Other speakers congratulated the company for financing projects like the Arapahoe station with private capital. A tour of the station followed the talks

$25 Million Bond Issue Sold By Seattle

Seattle City Council has sold a $25 million City Light bond issue to a combination headed by Halsey, Stuart & Co. of New York City, at an effective interest rate of 2.8231%. The only other proposal, offering an effective interest rate of 2.83720%, was submitted by Blyth & Co. and associates, which purchased a $28 million City Light issue last February at a slightly lower rate. Sale price on the 2¾% interest-bearing issue will be $24,452,425. The funds will be used to complete the Ross hydroelectric project and to expand City Light's transmission and distribution facilities. Earliest maturity date is 1970, with the last of the bonds to mature in 1987.

Company Announces Expansion Program

Some $843,000 in construction plans have been announced for the remainder of 1952 by Western Colorado Power Co. According to J. A. Bullock, vice-president and general manager, completion of the Cascade flowline rebuilding program in the Durango, Colo., area is a major feature of the year's work. Completing a four-year operation carried on in easy stages, 7,700 ft of buried steel pipe will replace the last portions of an old wood-box flume that has carried water into Electra Lake and the company's Tacoma plant since the initial installation of electric service in the Western Slope sector of Colorado at the turn of the century. Replacement of the final sectors of the line is slated to cost $275,000.

Transmission line work includes 7¾ miles of new 44,000-v line across high country between Silverton and Red Mountain, at a cost of $46,500.

The program includes preliminary work, including engineering and design phases, for a 6,250-kw generator at the Jim Bullock plant in Montrose. However, the bulk of this construction will be handled in 1953. A 6,250-kw generator was placed in operation at Montrose a year ago.

● **Pacific Power & Light** Co. has announced plans to build a $190,000 warehouse and line department headquarters building at Yakima, Wash. Designed by Architect John S. Villesvik of Yakima, the new building will be 175x132 ft, with a 24x104-ft loading dock and a 40x78-ft transformer storage platform. It will have offices for the district line superintendent, service dispatcher, line expansion engineering staff and storekeeper. Provisions will include a locker room and showers for line crews, as well as an assembly room for safety training and similar group meetings. Motor vehicle service facilities will be included in the new quarters.

Contract Let for Pit Diversion Tunnel

A contract was awarded last month to Walsh Construction Co. for construction of a diversion tunnel, first major element of Pacific Gas and Electric Co.'s proposed hydro development on the Pit River in Shasta County, Calif.

The tunnel, 4 miles long, 19 ft in diameter and concrete lined, will divert water from the river to the proposed Pit 4 power house. Tunneling will take 2½ years and a peak labor force of 350 men.

Preliminary work is already in progress, including construction of an access road and a power line. Pit 4, which will cost some $25 million, will have a generating capacity of 84,000 kw.

FPC has given the utility a temporary go-ahead on its application for amendment of an existing license to include the Pit 4 project in its Pit River system.

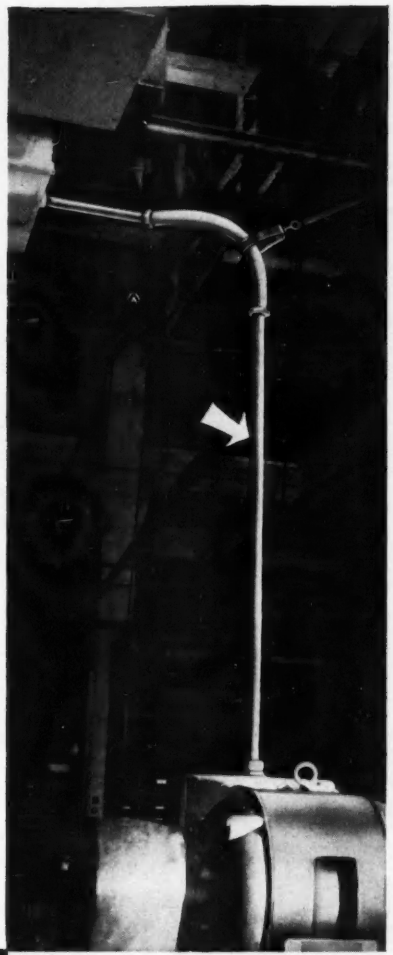
● **The T. W. Sullivan plant** will be the new name of Portland General Electric Co.'s Oregon City hydroelectric plant as soon as a $2.5 million expansion program is completed to boost production from 5,000 to 15,-000 kw. Mr. Sullivan, for whom the plant is being renamed, was PGE's hydraulic engineer for 50 years until his death in 1940. His son, George E. Sullivan, is the company's vice-president in charge of operations.

How High Standard Mfg. cuts costs by using POWERDUCT from busduct to machine

"Powerduct Cable means a big saving for us," says Frederick Lynn, chief electrician at The High Standard Mfg. Corp., Hamden, Conn., makers of Hi-Standard firearms, internationally famous for their accuracy and painstaking craftsmanship.

"You'd be surprised that a very big item is being able to use Powerduct over and over again as production increases and model changes are made. Twelve feet, fifteen feet, it doesn't make any difference. I'm able to use it any place. Powerduct is never wasted. That's why it's less expensive.

"Because busduct with Powerduct means complete flexibility, we increase the use and mobility of the machine. Our crew saves many man-hours by being able to plug in Powerduct instead of wiring a whole rigid conduit system."



"For heavy equipment we plug the cutout in the busway and run the Powerduct almost directly to the machine. It's not likely this machine will be moved, so the usual loop is not necessary."

"Here's the installation for lighter equipment. By varying the size of the loop I can move the machine."

Powerduct complies with Section 3646 to the 1951 National Electrical Code.

Powerduct has full Underwriters' approval, costs less than any other approved type of cable. For further details on Powerduct, contact your nearest Anaconda Distributor or Anaconda Sales Office—or write to Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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No mistake . . . You know you are getting *Certified*. You read at a glance cable type, size, voltage, "P116BM". . . which indicates approval by the Pennsylvania Bureau of Mines, and acceptance for listing by the U.S. Bureau of Mines. Easy to measure..."Bronco" is repeated every 2 feet.

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***More Neoprene* makes long-lasting Bronco 60 *Certified more resistant* to oil, acids, alkalis, ozone, gasoline, salt water.**

In addition, with Bronco 60 *Certified* you get: 1. Cold Rubber Insulation. 2. Branded Jackets. 3. Superior Flexibility.

So, BE CERTAIN, GET *CERTIFIED* — the greatest cord value on the market!

SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

SPILLWAY DAM BIDS CALLED ON THE DALLES PROJECT

Bids for construction of the spillway dam in the government's The Dalles Dam project on the Columbia River will be opened in the office of Col. Thomas H. Lipscomb, Portland district engineer, on Oct. 7. Estimated cost of work under this contract is some $15 million. Cost of the entire project, with 15 generators installed, is estimated at $350 million.

First contract for construction work on the project was let last January to S. A. Healy Co., White Plains, N. Y. It was for coffer dam excavation for the power house. The coffer dam has been completed and the excavation specified in the $4,888,000 contract is under way.

Plans of the Corps of Engineers call for first delivery of power in November 1957, and completion of all units in 1960. About six years will be required to complete the major structure in the project.

Yakima System Will Be Expanded by PP&L

Pacific Power & Light Co. has announced that it will spend $1,144,000 for construction in the Yakima, Wash., area this year.

Largest item is $637,000 to supply electric service facilities for new business enterprises, homes and farms that are being established this year. Two new heavy-duty feeder lines, one of which will connect with the steam generating plant at the Cascade lumber mill near Yakima for help in emergencies, will be installed at the $547,000 River Road substation which the company completed in Yakima late last year.

Capacity of the substation serving Wapato will be doubled, while the Sunnyside substation will be enlarged and a new substation will be installed in the Granger area.

A program of rebuilding power lines to boost existing capacity is being continued, for the third year, with another two years required for completion.

● **Authority** to issue and sell $7.5 million of first mortgage bonds has been issued by the Oregon public utilities commissioner to Pacific Power & Light Co. Proceeds from sale of the bonds will be used in furthering the company's construction program, including the Yale hydroelectric project on Lewis River in southwestern Oregon.

"We get CONSISTENTLY EXCELLENT RESULTS with D-H ALLOYS"

... says Resistance Products Company, of Harrisburg, Pennsylvania

This company produces precision wire-wound resistors of utmost stability for electronic equipment used by the Armed Forces and for makers and users of test instruments, meters, and scientific apparatus of various types. The vital accuracy of much important equipment, therefore, is very dependent upon the quality of the resistors coming off the production lines of Resistance Products Company.

In view of this, Driver-Harris is particularly gratified to have Resistance Products state: "Reflecting our experience with Driver-Harris alloys is our large use of Karma wire. Currently, we are employing Karma for numerous critical applications where utmost stability, together with high resistivity and low temperature coefficient of resistance, is requisite. *Consistently excellent results* are being obtained. We have, in fact, used Karma with outstanding success ever since its introduction several years ago. It is our belief the development of this alloy constitutes a major forward step."

Karma* is ready to serve you, too; as are world-famous Nichrome* and Nichrome V, and over 80 other alloys developed by Driver-Harris for the electrical and electronic industries. We feel confident that, like Resistance Products Company, you'll realize exceptional advantages by putting one or more D-H alloys to work for you. Let us have your specifications. We'll gladly make recommendations based on your specific needs and have our engineering department help you obtain best results.

KARMA* and world-famous Nichrome*
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Driver-Harris Company
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BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco
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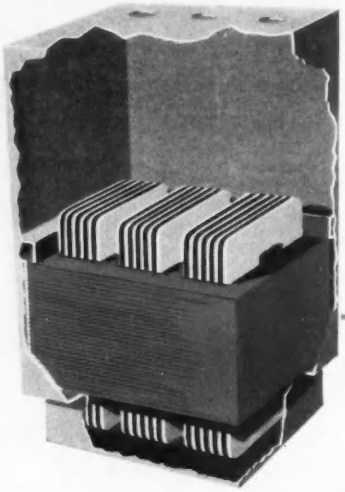
*T.M. Reg. U. S. Pat. Off.

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD



This design

takes stress better

The Form-Fit design of Westinghouse Power Transformers has inherent advantages that no other transformer can equal for handling both surge and short-circuit stresses.

The fact that the winding contains only a few coils of large plate area, results in the best relationship between series capacitance and ground capacitance and gives, inherently, more uniform distribution of lightning surge across the winding. This construction eliminates the need for shields, arresters or other internally mounted protective devices likely to cause trouble. As a result, operating hazards are minimized . . . design margins and safety factors are increased.

Because short circuits set up, in all transformers, magnetic fields that tend to force high and low-voltage coils apart, Westinghouse Form-Fit Transformers are arranged with high and low-voltage coils interspersed, so that these forces, acting over broad areas, essentially balance each other and are reduced to absolute minimums. Furthermore, because the core surrounds, supports and protects the coils, the mechanical strength of the mass of core material is added to the strength of the case, providing an unbeatable combination to withstand all mechanical stresses.

To all this, add the advantage of more efficient cooling, and the saving in installation cost because they are smaller and lighter than any comparable transformer, and you'll quickly see why it pays to specify Westinghouse Form-Fit Power Transformers.

Ask your Westinghouse representative for further information, or write for Booklet B-4142A: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70643

50,000-kva, 132-kv transformer installed at West Penn Power Company's Mitchell Station.

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

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CONDUIT AND PIPE
INSTALLATIONS

...with a GREENLEE PIPE BENDER

Cut costs, speed your jobs this efficient, easy, economical way. Make "on the job" bends in pipe and rigid conduit up to 5", thin-wall conduit and tubing with a GREENLEE Hydraulic Bender. One man operated for fast, accurate, uniform bending. Simple to operate, easy to set up and shift from job to job. Not only saves labor, but eliminates cost of many manufactured bends and fittings. Often pays for itself on first few jobs. Write today for free folder No. E-201.

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Other GREENLEE timesaving tools for industry: Hand Benders for Tubing • Hydraulic Pipe Pushers Knockout Tools • Auger Bits and Drills • Spiral Screw Drivers • Chisels and Gouges • And many others. Greenlee Tool Co., 1769 Columbia Ave., Rockford, Ill.

BPA REPORTS PLANS FOR TRANSMISSION LINES

Scheduled construction of key Bonneville transmission facilities for the new fiscal year beginning July 1 are assured in the Interior Department's appropriation bill, according to Paul J. Raver, administrator.

A total appropriation of $73,123,400, represents a cut of about $500,000 from last year's appropriations of $73,623,439. The new appropriation provides $66,523,000 for construction including $4,096,400 for prior liquidation, and $6,600,000 for operations and maintenance.

Funds will permit initial construction on two new major 230-kv grid lines from Chief Joseph Dam to northwest Washington during the current 1953-54 fiscal year.

Key new secondary transmission facilities provided for in the new appropriations include construction of a 115-kv transmission line and substations for service to the Tillamook County area from Forest Grove, a short interconnecting transmission line to integrate Albeni Falls Dam with the Columbia River grid, and Lookout Point-Alvey line No. 2 and substation.

Grid facilities now under construction designed to transmit power from McNary, Hungry Horse, Lookout Point and Detroit Dams during the current fiscal year can go ahead on schedule with the new appropriations. Other facilities provided for will relieve present critical loading of grid lines from Bonneville and Grand Coulee Dams, now carrying power peaks of over 2,700,000 kw.

Major 230-kv grid appropriations for the new fiscal year total $47,879,000 and include: Columbia-Olympia line 3 and facilities; Covington substation additions; Snohomish-Kitsap line; Grand Coulee-Snohomish line 2, communications; Chief Joseph-Snohomish lines 3 and 4; McNary-Big Eddy-Troutdale; McNary-Big Eddy-Ross; McNary-Maupin-Detroit; Detroit-Albany; Detroit-Chemawa; Ross-St. Johns conversion; Midway-Big Eddy-Maupin-Detroit; Eugene communications; southwest Oregon loop lines and facilities; Coos Bay area service; McNary switching station; McNary-LaGrande service, and system reactive facilities.

Budget requests for area facilities:

Northwest Washington-Puget Sound area, $1,856,000—Shelton-Kitsap-Bremerton line 2; Bellingham substation; Quinault service; Tacoma tap; Raymond-Aberdeen line.

Portland - Longview - Chehalis area, $1,552,000—North Bonneville substation additions; Troutdale substation additions; Longview area service; Chehalis substation additions; Clark County service; J. D. Ross substation additions; Forest Grove-McMinnville; Salem-Boyer; Westport-Cathlamet lines; Astoria substation additions; Tillamook service.

Southwest Oregon area, $1,037,000—Eugene-Reedsport service; Detroit substation; Toledo substation additions; McKinley-Gold Beach; Lebanon-Springfield; Middle Fork Willamette River projects; North Santiam Valley facilities.

Northeast Washington area, $779,000—Spokane substation additions; Spokane-Colville-Spirit service; Four Lakes service.

Idaho Panhandle, $745,000—Bonners Ferry-Troy line; Troy and Newport substations; Albeni Falls loop.

Central Washington, Central and Eastern Oregon, $3,807,000—Columbia substation; Columbia-Ellensburg line; Franklin substation additions; Okanogan and Ferry county service; Richland-Kennewick lines and facilities; service to aluminum plant at Wenatchee; Midway substation additions; The Dalles substation additions; Columbia Basin service; Warden substation; Orondo substation; Moxee switching station; The Dalles Dam service; Quincy substation; Franklin county service; Valhalla-Keokuk line; Rocky Ford-Soap Lake line; Moses Lake substation.

Western Montana area, $1,593,000—Hungry Horse-Hot Springs line; Hot Springs switching station; Hot Springs-Anaconda line; Hot Springs-Spokane line.

General structures, communications, tools and equipment, and operations facilities, $4,665,000—Communications, tools and equipment, and Portland operations facilities.

● **Centralia, Wash.,** has announced plans to build a $1.5 million addition to its municipal hydroelectric plant at nearby Yelm. Capacity would be increased from 5,000 to 10,000 kw, according to Finance Commissioner Reid H. Conrad. The city already has $500,000 available for the project and plans to borrow another $1 million.

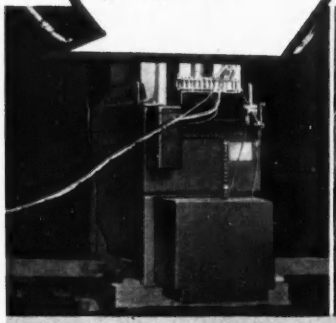
● **Franklin County** PUD of Pasco, Wash., has sold a $400,000 issue of revenue bonds to McLean & Co., Tacoma, and two Portland, Ore., firms—Fordyce & Co. and Charles N. Tripp Co.—at an effective interest rate of 3.312%, Manager Harry H. Hudlow has announced. Four other bids ranged up to 3.54%.

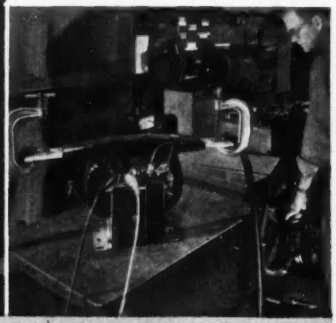
"A to Z" Testing Takes Guesswork Out of Switchgear Performance

Assures Quick Installation . . . Proper Operation . . . Long Life

THREE TYPES OF TESTS — design . . . inspection . . . and routine tests are used to check and double check Allis-Chalmers switchgear. Briefly, here is the careful, orderly system of tests used to assure you of a quality product.

ALLIS-CHALMERS





1. Design Testing — Most spectacular in the whole long series of design tests is the short circuit test of a Metal-Clad Switchgear breaker. Other tests in this series include impulse, temperature, dielectric, life and radio interference tests.

2. Inspection Testing — Typical is this check of ratio and phase angle accuracy of an instrument transformer using highly accurate Silsbee set. Perfect operation of assembly is based on perfect operation of parts.

3. Routine Testing — Specially built portable test wagon makes possible testing of completed switchgear right on the assembly line. This versatile unit tests: circuits, meters, interlocks, control schemes, throwovers, phasing, potential and circuit transformers, relays of all types, dc equipment, etc.

TESTS

Design Tests:

short circuit interrupting tests
momentary current test
temperature rise
dielectric test — one minute — 60 cycle
impulse voltage test
operational life test
radio interference test
corona level
speed graph
minimum and maximum closing voltage test
repetitive operation test
transformer core loss test
transformer saturation test
transformer impulse test

Routine Tests:

one minute, 60 cycle dielectric test on primary and secondary circuits
closing and tripping test
minimum and maximum voltage test
speed graph
Check of: watthour meters, overcurrent and directional relays, instruments, etc. A 3 phase secondary current load and normal 3 phase potential is used
Control tests of: interlocks, throwover schemes, sequence operational schemes, control schemes

Inspection Tests:

instrument transformer dielectric test
instrument transformer ratio and phase angle tests
analytical tests of raw materials such as: copper, silver, steel, aluminum, brass, *Bakelite* insulation
inspection of component materials: meters, relays, insulation, porcelain

In addition to testing every removable element and every stationary element to assure proper performance, every one is built to master jigs to assure easy installation and interchangeability. For switchgear you can depend on, call your nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee 1, Wis.

A-3815

ALLIS-CHALMERS

leading photoelectric control

FOR STREET LIGHTING

The F-P Series 63300B Control is the latest unit in a proven line of photoelectric controls for street lighting that have been operating successfully on lighting circuits for over seven years. Today there are more than 35,000 F-P Controls in use by over 700 utilities.

Fisher-Pierce has maintained leadership in photoelectric street lighting control through:

PERFORMANCE — F-P Controls provide street lighting safety because lights are on *when needed*, regardless of time of day. Because the control is photoelectric, it depends only on natural light values for operation. There is no mechanical device to get out of phase with actual daylight conditions.

ENGINEERING — The F-P Series 63300B circuit and technical operating features are the result of years of field experience. The development work and testing was performed in conjunction with utility engineers. The Fisher-Pierce organization is in a position to help utilities in planning, installing and maintaining control systems.

ECONOMY — F-P Controls provide true economy: purchase price and cost of installation are low. Maintenance is practically negligible as compared to other control methods. To give you a picture of this F-P economy, we will be glad to refer you to some of our customers who have had extensive field experience with these controls.

Write for Bulletin 63300B.

FP

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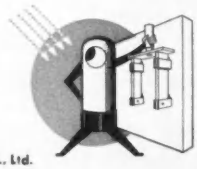


ORDINANCE TO PAVE WAY FOR DISPUTED LINE

Los Angeles City Council has requested the city attorney to draw up an ordinance preparing the way for construction of part of the controversial 21-mile transmission line through San Fernando Valley by the Department of Water & Power.

The council's 8-6 vote was on a recommendation by the department. The council is expected to wait two or three weeks before taking action on the ordinance, in order to give opponents of the project time to assemble arguments.

Valley property owners have strenuously objected to the entire overhead line. They contend it should be put underground. Department engineers say that an underground line would cost $29 million against $11 million for an overhead one. Los Angeles' Chamber of Commerce is supporting the department's stand.

Present ordinance would authorize acquisition of lands along a 7.6-mile route connecting with receiving and distributing station J, now under construction.

PUD Asks Permit for Priest Rapids Dam

The Washington State Supreme Court decision that approved plans of the Pend Oreille PUD to build a dam on the Pend Oreille River (EWEST, August 1952, p 114) also cleared one obstacle to proposed construction of a dam across the Columbia River at Priest Rapids by the Grant County PUD.

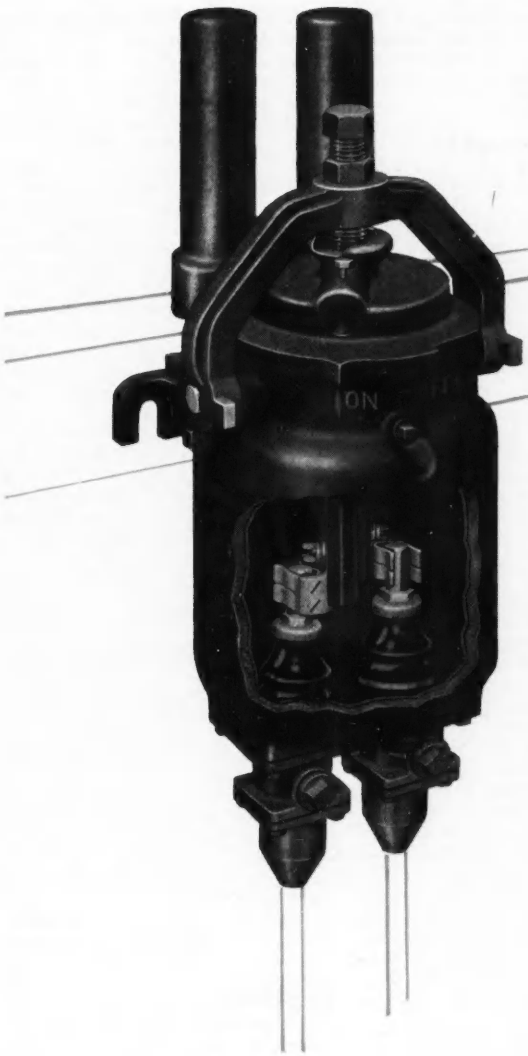
Accordingly, the Grant PUD filed an application with the FPC for a preliminary permit to construct the Priest Rapids Dam.

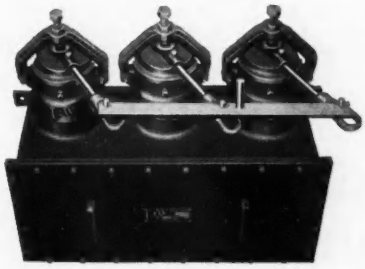
The Grant PUD move is regarded more as an attempt to speed construction of the dam by the Corps of Engineers than as a serious attempt of the PUD to build the dam itself.

● **Franklin County PUD** has moved into a $135,000 building at Pasco, Wash. The 75x108-ft building includes, besides offices and space for maintenance equipment, an auditorium for home demonstration and for use by clubs and organizations. It is of reinforced concrete, one story high.

● **Douglas County PUD** of Bridgeport, Wash., has received approval of a $1,025,000 loan from the REA to build 42 miles of distribution lines to serve 450 consumers and improve the existing system.

CAST STEEL TANK (HERMETICALLY SEALED—OIL FILLED) PROTECTS MEN AND EQUIPMENT BY SAFELY WITHSTANDING HIGH PRESSURES OF HIGH VOLTAGE FUSE CLEARING A HEAVY SHORT CIRCUIT





"FC" OIL FUSE CUTOUTS

2500 — 5000 — 8000 VOLTS

In addition to the main purpose—a pressure tight enclosed fuse—the device serves as a full load break oil switch. The gang operating mechanism provides for three phase sectionalizing. The switching contacts are Beryllium copper. Fuse links are simple and inexpensive, easily replaceable in the carrier on the removable cover of the cutout tank.

Welded steel boxes with cutouts on top, enclose connections to feed and load circuits.

Bulletin CA50 gives data and prices. Write for a copy or ask your representative.

G & W "Forethought" CD1-3 shows how "FC" cutouts are combined with "RAL" oil switch. Send for your copy, there is no obligation.

G & W ELECTRIC SPECIALTY CO.

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Cable Terminating, Connecting and Sectionalizing Devices

Representatives in principal cities of U. S. A.

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EDISON TO BUILD STATION IN LANCASTER DISTRICT

Plans have been announced by Southern California Edison Co. for its Antelope substation in the Lancaster district, to be completed by mid-1953 at a cost of approximately $2,013,457. Bechtel Corp. will be general contractor.

Initial installation will be 100,000 kva, with provisions for an ultimate capacity of 400,000 kva. Included will be two 220-kv transmission lines and seven 66-kv transmission lines. A transformer bank consisting of three 333,333-kva transformers and one spare will be installed and the ground bank will have three 1,500-kva transformers.

Control and relay house will be constructed by means of the tilt-up process and will be surrounded by a chain link fence. A 25,000-gal elevated water sphere is included in the plans.

Line Built to Serve Utah Mining Operation

Utah Power & Light Co. has built a high-voltage line to provide power at the Howe Sound Mining Co. refinery at Garfield, some 15 miles from Salt Lake City. The refinery, utilizing new principles developed by the Chemical Construction Corp., will be the nation's initial supplier of any sizeable tonnage of cobalt. The $1.4 million plant is scheduled to process 35 tons of cobalt concentrate daily for a production of 2,000 tons of pure cobalt annually, or virtually 40% of the world's known output. Operation is scheduled for late summer.

The new line is being extended, in a mountain-scaling operation, to two TV transmission towers to be constructed atop 9,000-ft-high peaks of the Oquirrh Mountains, west of Salt Lake City. The towers will enable KSL-TV and KDYL-TV to blanket most of central Utah and parts of Nevada.

Union Consolidation Endorsed in Hawaii

A trend toward consolidation by other labor unions in Hawaii, now has been endorsed by electrical workers. Union leaders say it offers economy of operations, better service to members and more unity.

A new consolidated Local 1260 of the International Brotherhood of Electrical Workers, AFL, now is bargaining representative for employees at Hawaiian Electric Co. and its subsidiary, Hawaiian Electric Supply Co.; Mutual Telephone Co., Molokai Electric Co., Kona Light & Power Co. and service department employees of W. A. Ransay Ltd.

Walter Eli is business agent assisted by David McClung and Francis J. Kennedy. Unpaid officers are: McClung, president; Henry Rezentes, vice-president; Larry Lee, recording secretary; Alexander Awo, treasurer.

More Funds Approved for Phoenix Street Lighting

Second phase of a four-year street lighting program in Phoenix, Ariz., has been approved and $150,000 will be spent in 1952-53.

Arizona Public Service Co. underwrites costs and has installed 120 intersection lights since the project was started, bringing city total to 1,135. Whiteway lighting of downtown streets has increased from 3 to 12.3 miles, with 651 ornamental high-intensity lights added for a total of 919.

The city's light bill was about $120,000 during the past year. With improvements, the cost will go to about $170,000 in 1952-53.

● **Bids for construction** of a $2 million City Light administration building at Tacoma, Wash., have been called by the Tacoma Municipal Board of Contracts and Awards, for opening Sept. 15. Plans call for a 300x100-ft four-story reinforced concrete building with offices, an auditorium and cafeteria facilities for City Light units now scattered throughout the city. Some offices of the Tacoma Water Department also will be housed there.

● **Shop and field unit employees** of the Salt River Power District, Phoenix, Ariz., have received wage increases and fringe benefit adjustments ranging from 2½ to 7½c per hour. Employees affected included electrical foremen, shift foremen, a mechanical maintenance foreman and machinists.

● **The annual convention** of the California Municipal Utilities Assn. will be held in the U. S. Grant Hotel at San Diego, Sept. 30 to Oct. 3. Discussion will include: the tidelands case, power development, liabilities from municipal utility operation, rights-of-way and condemnation, personal interviews, and retirements and social security.

MOBILE CONFERENCE ROOM TAKES PROGRAM TO FIELD

No matter where an employee is located, or what his duties are, Public Service Co. of Colorado's education and information department can reach him with its new mobile conference room.

Rapid expansion that had more than doubled the size of the company since the end of World War II had made it difficult to maintain close contact with employees, particularly in the operating departments. To solve this problem, a converted passenger bus now travels to all points on the company system.

Employees whose duties seldom take them near the main office now sit in the bus and discuss problems and programs, learning first hand about the company and their jobs.

Safety, job improvement methods, company expansion plans are some of the subjects discussed informally. The bus is equipped with a daylight movie projector and flip charts for audio-visual training.

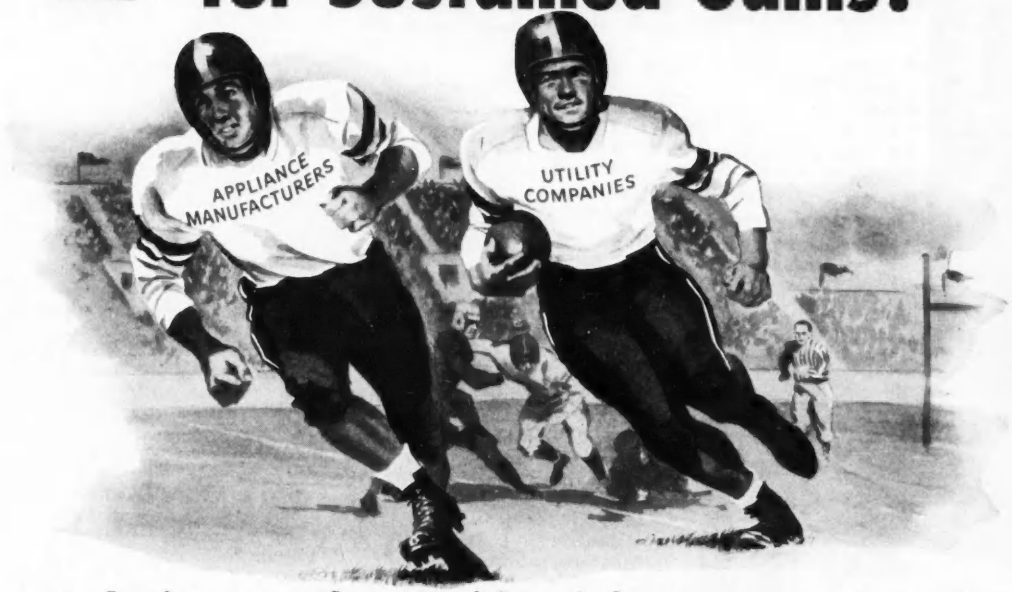
An average of 40 persons a day attends the meetings. In addition to the saving in man-hours, the traveling conference room has the advantage of stimulating discussions through small groups and informal setting, officials point out.

Hydraulic Lift Trailer Cuts Reel Loading Job

Hawaiian Electric Co. has reduced the job of loading a heavy reel of cable onto a trailer from a five-man to a one-man operation. The shift was accomplished with the development of a special $750 hydraulic lift trailer, conceived by E. V. Schoenberg of the HECo staff and executed by American Trailer Co.

With cable reels weighing as much as 3,000 lb it used to be quite a task to hook them onto a trailer and then hook the trailer onto a tow truck. The new trailer has an A-frame like the old one with the top of the A hooked onto the tow truck and the cable hooked between the legs. The hydraulic ram and a set of lifting arms are added to pick up the reel and heave it into an elevated position. Spring-backed pins lock it into place once it is mounted so that it is secure even without hydraulic power. A second ram at the head of the A-frame can raise or lower the towing pintle to just the height needed to hook onto the truck.

Teamwork is Necessary for Sustained Gains!



A Solution to the Residential Revenue Question

Just as the need for electric refrigeration was established through the cooperative efforts of the electric utilities and appliance manufacturers, so will today's low-saturation appliances take their places alongside the refrigerator in America's homes.

As the demand grows for today's specialty appliances, the solution to the residential revenue question becomes evident. Added revenue will come from the wider use of Dishwashers—Disposalls ®—Freezers—Automatic Dryers—Ironers—Automatic Washers—as well as from Electric Ranges and Water Heaters. Teamwork between utilities and manufacturers can turn the trick.

Hotpoint, with its tradition of close cooperation and understanding of utility problems has taken the lead in the promotion of all-electric living. Promotion emphasis has been put on all-electric kitchens and home laundries—not on just one or two appliances. Acceptance is being built for the complete line of electrical servants.

And now, to aid in developing a better balanced, more profitable domestic electrical load, we have available for you new studies on "Balanced Revenue Through Selective Selling" and "Consumer Survey Plans for Retail Salesmen." You can get full information on these studies by writing the Utility Division, Hotpoint Co.

Hotpoint Co.

(A Division of General Electric Company)

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NOTES ON THE TRADE

● **Whitney Electric Co.**, for 39 years at its present location at 208½ N. Tejon St., Colorado Springs, plans to move as soon as a new building is completed at 815 N. Tejon, six blocks away. **Matt Whitney**, pioneer electrical contractor of Colorado Springs and president of the company, now has associated with him his two sons, **Harold M. Whitney** as vice-president and **G. Winston Whitney** as secretary. The new building will greatly increase the warehouse and shop facilities, provide a small display and office area at the front, and an apartment for Matt Whitney upstairs. The firm no longer handles major electrical appliances but specializes in electrical wiring and construction. It also handles the spectacular Christmas street decorations each year for Colorado Springs.

● **American Electric Co.**, electrical wholesalers with headquarters in St. Joseph, Mo., and branches in Wichita and Colorado Springs, has opened a new branch at 820 W. Fourth St., Pueblo, Colo., with **James C. Donly Jr.** as its manager. Colorado manager is **J. D. Akers,** now headquartered at Colorado Springs. A new building, providing 6,500 sq ft of display and storage space with a contemplated 15,000 sq ft when needed, plus a parking lot, will bring Pueblo wiring supplies and appliances at a convenient local source. **Wayne Thornburgh** will be sales manager of the Pueblo house.

● **An all-electric** drilling rig, designed for depths of more than 15,000 ft, will be installed by Tidewater Associated Oil Co. at its Ventura, Calif., field. Power will be furnished by a substation mounted on a trailer. Westinghouse will furnish for the rig four 250-kw motor generator sets to change a-c received from the power company lines to d-c; an 800-hp drawworks motor; two 500-hp and one 100-hp mud-pump motors, and electrical controls for the a-c, d-c system.

● **Arthur C. Maryon Co.** has been appointed Kaye-Halbert distributor for the San Francisco Bay area. Maryon has offices at the Western Merchandise Mart, 1355 Market St., San Francisco, and also handles Conlon washers and some lines of floor and table lamps.

● **The Electric Supplies Distributing Co.** has announced the personnel of its organization following a meeting of the board of directors recently. The company operates branches from its San Diego headquarters, both in Santa Ana and Long Beach. Chairman of the board is **Sam L. Hall Sr.**; president, **Fred G. Goss**; vice-presidents, **Gene M. Cramer** and **Milton C. Taylor**; treasurer and assistant secretary, **Harvey W. Jeppesen**; and secretary, **Charles Fox Jr. Bud Delano** has been appointed sales manager of supplies and apparatus succeeding **Bart A. Murray,** who has become vice-president in charge of the Santa Ana house. **Dewey Peterson,** former supply and apparatus sales manager of Westinghouse Electric Supply Co., Los Angeles, will be manager of the L. B. Marsh Electric Supply Co., which is the Long Beach branch of ESD company. **Harry Wade** will continue as manager of the L. B. Marsh Appliance Co., and **Frank Sarson,** former manager of the supply company, will continue in an advisory capacity. The firm recently bought both the L. B. Marsh Electric Supply Co. and L. B. Marsh Appliance Co. of Long Beach.

● **Guy de Leuze,** president of Panama Lamp & Commercial Co. Inc., recently announced that his company is stocking the Swivelite line and some of the special-type lamps for accent lighting manufactured by Amplex Corp. of Brooklyn, N. Y. Panama maintains offices and warehouse stocks at San Francisco, Los Angeles and Seattle.

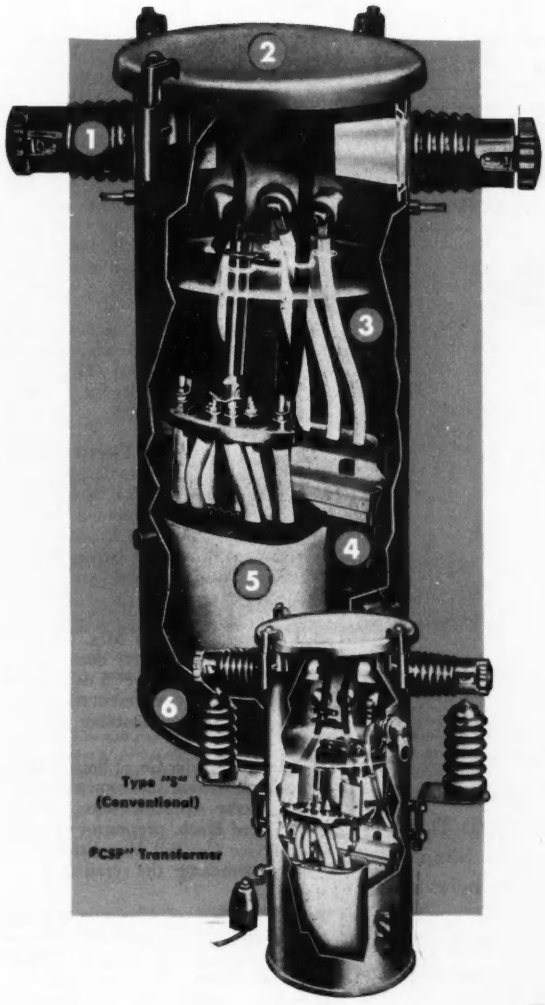
● **Agutter Electric Co.**, electrical contracting concern at Seattle, has purchased a $50,000 building at 14th Ave. N.W. and Market St. for warehouse use. The building is a one-story masonry structure on a 107x200-ft lot.

● **John Rheuff Electric** Co. in Pueblo has recently remodeled the pioneer electric shop started by his father at 410 N. Santa Fe Ave., Pueblo. An attractive appliance display is maintained in the front of the store, with the wiring department at the rear.

● **Adelman Machinery Co.,** 520 First Ave., S., Seattle, has been appointed a distributor for Allis-Chalmers motors. **R. H.** and **W. J. Adelman** are partners in the concern.

● **J. T. McAllister** has been made Hoffman Radio Corp.'s service manager, with headquarters in Los Angeles.

These Features add years of *Continuous Service!*



You can literally *haul 'em out, hang 'em up and forget 'em* . . . when you install Westinghouse Distribution Transformers, either conventional or CSP®. Six construction features, standard on all Westinghouse Distribution Transformers, make them more reliable in service . . . cut your maintenance costs.

1. Rugged High Voltage Bushings for maximum electrical and mechanical strength. Break-Proof Enrup* clamping knobs make connecting easy and safe.
2. "Coastal Finish" checks corrosion, resists moisture penetration and weathering . . . adds years to life of the tank.
3. Wemco® C-I (Inhibited) Oil . . . increases service life at least three times. Free from acids, alkali, corrosive sulphur and sludging. Staves off emulsification.
4. Hipersil® Cores . . . carry ⅓ more flux than ordinary cores. Operate with higher efficiency, lower excitation current . . . permit smaller, lighter transformers.
5. Coil assembly allows increased thermal capacity by addition of larger cooling ducts and exposure of more area to oil. Result: greater short-time overload capacities . . . better voltage regulation.
6. Sturdy tanks . . . security tested . . . positively leakproof. Double-rolled rim locks tank wall to the recessed bottom, assures rigid support.

Your Westinghouse representative will be glad to give you full details on all these features. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70623

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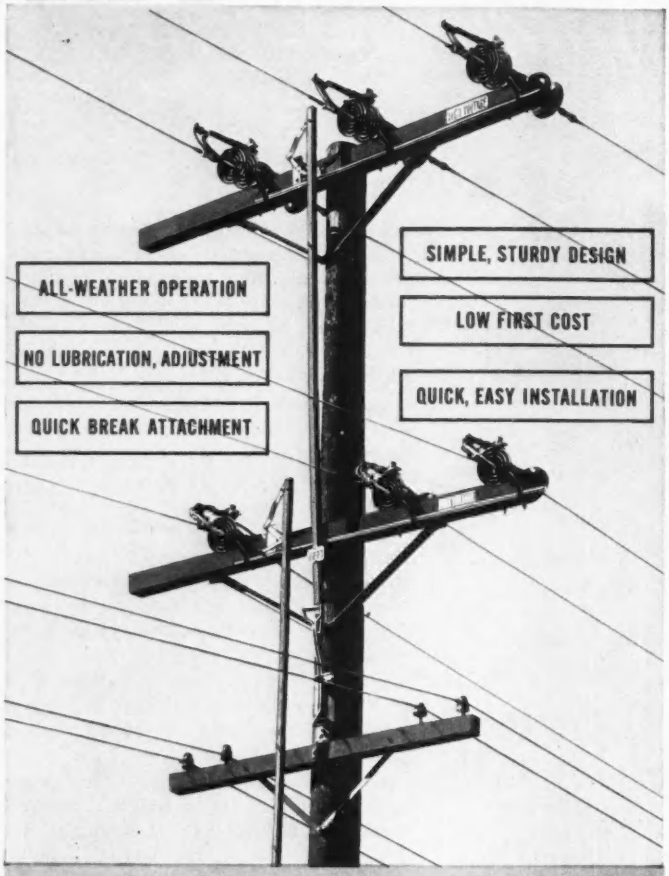
Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

KPF **POLE TOP SWITCHES**



MORE SWITCH FOR LESS MONEY

KPF Pole Top Switches cost less to buy and give longer service because they are simplest in design, sturdily built. They need no separate deadends, no "extra" insulators. Simple "3-step" installation saves man hours—(just bore holes in cross-arms, tighten bolts, attach connectors). Insulator stacks easily adjusted for line sag. Free-floating, self-aligning, silver-surfaced blades always maintain proper contact. Vertical, horizontal or triangular mounting. Write today for Catalog, details of KPF switches.

3504

KPF **ELECTRIC COMPANY**
1624 E. Alpine Avenue • Stockton 5, Calif.

● **Foothill Electric Corp.,** a subsidiary of Kaiser Engineers Division, has consolidated its warehousing, shop and office facilities at a new address, 1021 Sixth Ave., Oakland. It was formerly at 6436 Foothill Blvd. **John J. Howard,** manager, said the company has purchased a two-story building of approximately 20,000 sq ft for the new plant. Currently the company is making installation at the Kaiser aluminum plants in Louisiana and Washington.

● **The C. Kirk Hillman Co.** of Seattle, manufacturer of direct-current equipment and marine electrical controls, has been purchased by **Cyrus W. Ostrom** & Associates. Ostrom has been with the Hillman company since he was graduated from the University of Washington in 1922. He is president and general manager of the new company, in which **George M. Palo** and **Malcolm E. Hillman** of the Hillman organization also are associated.

● **R. H. Hirte,** former owner of Tri-State Electric Co. in Herrin, Ill., now represents Garden City Plating & Mfg. Co. in Los Angeles for southern California territory.

● **Kuchel & Sievers Electric Works** Ltd. recently moved to larger quarters for industrial wiring, motor service and industrial equipment service at 350 Kansas St., San Francisco. Its former plant on Fifth Street was in the way of the proposed extension of the free-way system.

● **Electric Machinery Mfg. Co.**'s office in Los Angeles has been moved to 335 E. Florence Ave., Los Angeles 3. **William King,** representative, also handles the Cornell-Dubilier line.

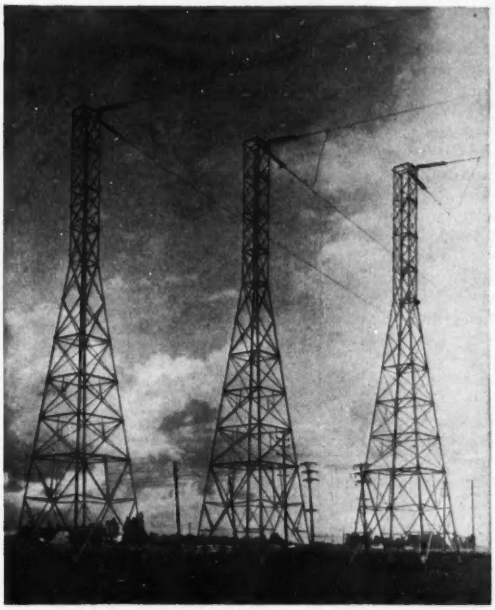
● **Electric Service Co.** of Boise, Idaho, recently took over the ownership also of the Terry Appliance Co., according to **Ferd Koch,** proprietor of Electric Service Co. **Bill Van Etton** is to remain to manage the retail stores.

● **Nutone Inc.** of Cincinnati, Ohio, has moved its Los Angeles office to larger quarters at 1734 S. Maple Ave., according to F. B. Marple, vice-president in charge of Western sales.

● **Titeflex Inc.,** makers of electrical connectors, flexible metal hose and shielding conduit, etc., has appointed **William Buckley** as West Coast representative with offices at Salsbury Corp., 1161 E. Florence Ave., Los Angeles.

Demand PROOF OF PERFORMANCE

for Superior Insulator Quality

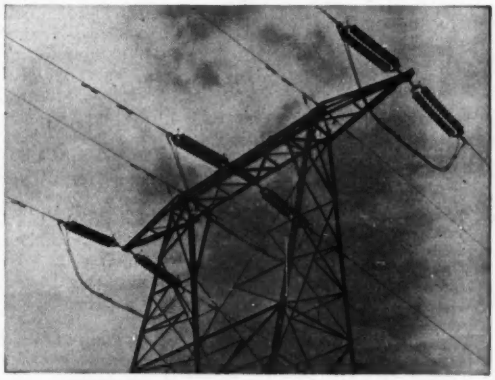


On right-angle towers, Thomas Insulators have the stamina that assures long life and trouble-free performance.

"Repeat Orders" are the best proof of insulator quality . . . and are the best evidence that all insulators are not alike.

Shown on this page are just two of the many Thomas insulator installations on the lines of one of the largest Western Utilities. For many years, this Customer has given us order after order. Such *repeat orders* from this and other companies are the best testimonials to the long life and outstanding performance of Thomas Insulators.

After all is said . . . it's still quality that counts plus proper designing, precision manufacturing . . . and PROOF OF PERFORMANCE. Throughout the world, Thomas Insulators have been establishing service records since the advent of the Electrical Industry. Why gamble?



Thousands of Thomas Insulators make certain that this 220-kv line will give satisfactory service for decades to come.

The R. Thomas and Sons Company is a manufacturer and designer of all types of porcelain insulators . . . pin-type, switch, suspension, spools, guy-strain, bushings and special high-voltage porcelain. In addition, Thomas supplies associated line hardware, clamps, fittings, preformed armor rods, and so on.

SPECIFY THOMAS INSULATORS—THE BEST BY LINE TEST

— Since 1873 —

The R. Thomas and Sons Co.

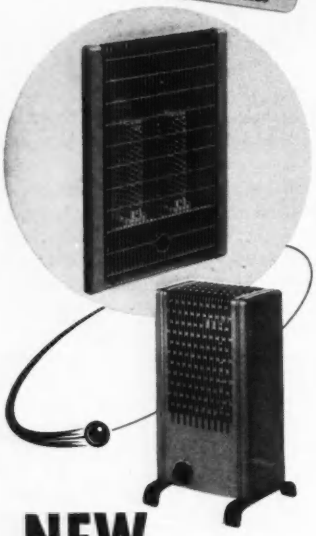
1873 THOMAS INSULATORS our 79th year RELIABILITY 1952

LISBON, OHIO

NEW YORK CHICAGO

Sales Representatives: C. G. Anderson, *Chicago* • E. B. Anderson Co., *Detroit* • Ken H. Best, *Seattle* • R. E. Cunningham & Son, *Los Angeles* W. H. Eddy Products Co., *Phoenix, Ariz.* • Engineer Sales Corp., *St. Petersburg* • R. F. Hamilton & Associates, *Denver* • Geo. E. Henn Company, *San Francisco* • W. J. Hugo, *Minneapolis* • Leiser & Company, *Philadelphia* • John G. Pattijohn Company, *Knoxville* • H. E. Ransford Co., *Pittsburgh* • J. F. Schaefer & Co., *Kansas City* • R. J. Sullivan & Company, *Boston* • Tafel Electric & Supply Co., *Louisville* • Walter E. Thompson, *Birmingham* • Triangle Electric Supply Company, *El Paso* • United Electric Supply Co., *Salt Lake City* • Williamson Sales Co. *Shreveport, Amarillo, Dallas, Houston, New Orleans, Pine Bluff* • *Representatives in other principal cities*

SELL
HEALTH and COMFORT
with... WESIX IONIX Wiredheat



NEW

Wesix-Ionix Wiredheat means better profits for you this heating season.

Wesix-Ionix Wiredheat destroys airborne bacteria, incinerates dust and pollen particles...actually freshens stale air by absorbing the positive charges common in urban air. Wesix-Ionix brings to the home balanced "Ion Rectified" air like that found in famous resorts, better health for the whole family.

Available built-in to both Wesix Wall Furnaces and automatic portable heaters, the new, patented Ionix feature costs nothing extra to operate, needs no maintenance or adjustment.

WESIX IONIX Wiredheat

Write your nearest Wesix office for complete information and promotional material.

WESIX ELECTRIC HEATER CO.
ROOM 91
390 FIRST ST • SAN FRANCISCO, CALIF.
LOS ANGELES • PORTLAND
SEATTLE • HUNTSVILLE, ALA

● Appointment of **Henry N. Muller** as sales manager of Electrical Facilities Inc. was announced recently by **Harold P. Knopp,** president of the company. Muller was associated with Westinghouse Electric Supply Co. for more than 25 years and was branch manager at Oakland for seven years. Electrical Facilities Inc., which has headquarters at 4224 Holden St., Oakland, was established in 1928. It engineers and manufactures precision laboratory apparatus, multirange transformers and other testing devices, as well as rectifier equipment.

● **Swartwout** Co. of Cleveland has opened a district sales and service office for its power plant and autronic control divisions at 317 W. Main St., Alhambra, Calif., to serve southern California, Arizona and Clark County, Nev. **Roger L. Gilliland** will manage the office. **Charles P. Crowley** will continue to handle special power plant equipment accounts from 711 Gibbons St., Los Angeles 31. Agents for the company's industrial ventilating division, Gil Moore & Co., will maintain offices at 714 W. Olympic Blvd., Los Angeles 5.

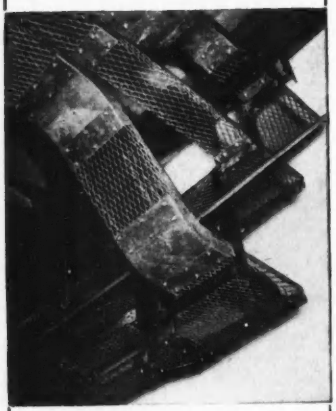
● **Electric Motor** Co.., 231 Imperial Ave., Calexico, Calif., has been named distributor for Allis-Chalmers motors, controls, Texrope drive equipment, pumps and transformers in Imperial County. **W. N. Glaze** is president of Electric Motor and **V. L. Easley** is a partner.

● **Sylvania Electric Products** Inc. has leased 20,000 sq ft of warehouse and office space in a new building at Seattle for its Pacific Northwest sales and service headquarters. The new building, at 3466 E. Marginal Way, was constructed according to Sylvania specifications.

● **Plans have been completed** for construction of a branch factory, office and warehouse at Seattle by the Square D Co., manufacturers of electrical equipment. The building will have 21,000 sq ft of factory space, which is expected to be more than doubled at a later date, and 3,600 sq ft of office space.

● **When its eighth pot line** went into production last month, the Mead, Wash., primary aluminum production plant of Kaiser Aluminum & Chemical Corp. became the largest in the country. Adding some 44,000,000 lb of primary aluminum to production capacity, the new pot line increases the plant's total capacity to 350,000,000 lb annually.

COPE
CABLE TROUGH



A better and less expensive means of supporting cables and instrument tubing. Eliminates engineering expense. Cuts installation costs.

Write For New Bulletin
GEO E. HONN CO.
Phone SUtter 1-7352
420 Market St. San Francisco

BURTON

Dry Type Distribution
TRANSFORMERS
10 through 300 KVA
in all Standard Voltages

Built to
ASA and NEMA
Standards

Burton Transformers are meeting the most severe tests with dependable, trouble-free service.

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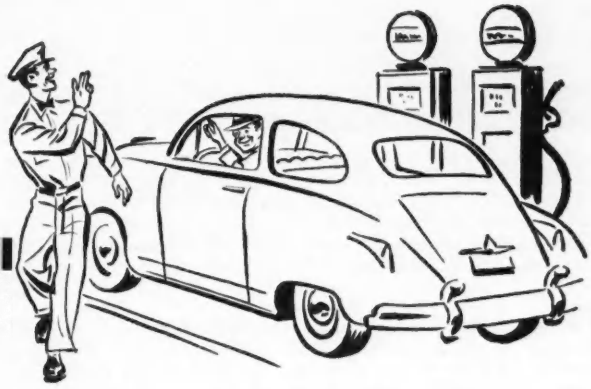
"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Nobody knows for sure how it started—this line about "See you at the Polls!" we're hearing all over these days.

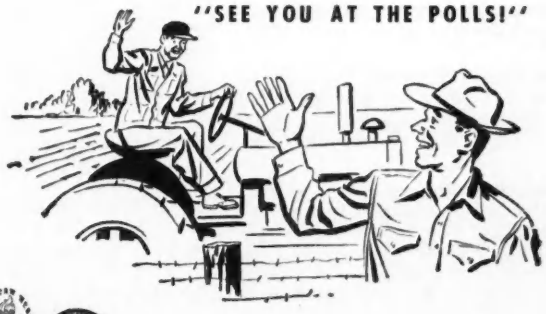
Best explanation seems to be that it came from that state candidate out west. . . . His opponent in a debate got all riled up and challenged him to fight it out in the alley.

But he said—"I'll settle this the AMERICAN way—I'll see you at the polls!" And the audience picked up the chant.

Now everybody's saying it—and on Nov. 4 everybody will be *doing* it!

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



ELECTRICAL WEST

Taken at PG and E's station C in Oakland, Calif., this picture shows workmen overhauling one of the area's oldest turbines. The rotary field is of European-type construction, now obsolete in this country, and has thousands of little brass wedges that must be removed and replaced to reinsulate all the old coils. Frank Petroski of General Electric's Schenectady staff flew to the coast to supervise the job, since he is the only man on the company pay roll who had previous experience with this type of rotary field

● **W. Karl Ostler** has been made Oakland branch manager for Westinghouse Electric Supply Co., succeeding **Henry Muller,** who resigned. Ostler joined Westinghouse Electric Corp. in Salt Lake City in 1926 and three years later became a salesman for the Inter-Mountain Electric Co. there. In 1933 he joined Westinghouse Supply. After serving as an Army captain in World War II, he managed the Morgan Electric Co. at Seattle and later operated the Ostler Electric Co. at Portland before rejoining WESCO at Oakland in 1950 as branch apparatus and supply sales manager.

● **Donald S. Bibbero** has been made district manager in northern California and Nevada for Free Sewing Machine Co. of Beverly Hills, Calif.

● **Joseph Devine** has been appointed application engineer in charge of Westinghouse Electric Corp.'s newly established Boise office. A graduate of Montana State College in electrical engineering, he joined the Westinghouse graduate course in East Pittsburgh after his discharge from the Navy at the close of World War II. In 1947 he returned to the West as electric utility department application engineer for the company with headquarters in Phoenix.

● **Paul S. Schmidt** succeeds Sam Hazleton as district engineer for the Pacific sales district of General Electric Co. Lamp Division at Oakland. Hazleton has gone to New York as supervisory engineer in charge of the New York sales district's engineering section after 11 years in the Pacific district. Prior to that he served in Philadelphia and Nela Park. Schmidt comes West from Detroit where he was field engineer for the Michigan sales district. He has been with G-E Lamp for seven years, having also served in the lamp works at Warren, Ohio, and at Nela Park.

● **Columbia Electric & Mfg. Co.** has opened a new sales office in 575 Dexter Horton Bldg., Seattle, with **Hal Gardner** as its local representative.

● **E. V. Roberts and Associates** will be West Coast sales representatives for Marion Electrical Instrument Co. of Manchester, N. H. Offices are at 5068 W. Washington Blvd., Los Angeles, and 988 Market St., San Francisco.

● **Samson Sales Co.** of San Francisco has been appointed to handle sales in Nevada and northern California for Ajax Electric Co. of Philadelphia, maker of electric salt bath furnaces for heat treating metals. Richards-Connant of Denver will cover Wyoming, Colorado, Utah, Arizona and New Mexico. W. E. Hartley of Seattle will handle Washington, Oregon, Montana and Idaho.

● **Ed Peterson** has been appointed manufacturers' representative in the San Diego County, Imperial County and Yuma, Ariz., area for Trade-Wind blowers and fans, Touch-Plate low-voltage wiring systems and Ruby Lighting fixtures. He has offices at 722 Bank of America Bldg., San Diego.

● **Entire interest** in Radio Television Supply Co. Inc., Los Angeles, has been purchased by **Jack H. Moulthrop,** president of the company. The company, which has announced plans to expand its activities in the field of general household appliances, has a three-story office and warehouse building at 341 18th St., Los Angeles.

● **Dan H. Radke Co.**, 754 Natoma St., San Francisco 3, has been appointed representative for the Cavaliar Corp., manufacturers of electric room heaters, for the states of California and Nevada. Stocks are available through his San Francisco warehouse.

● **Stusser Electric Co.** has named **Jerome B. Falk** to head a new appliance department, started as Stusser became distributor in western Washington and Alaska for Universal Major Appliances.

● **Minneapolis-Honeywell Regulator Co.** recently appointed **John O. Paull** branch industrial manager in Los Angeles and **Lee Aplin** to the same post in San Francisco.

● **Leo J. Meyberg Co.** has been appointed distributor of Perfection Stove Co. products in California and western Nevada.

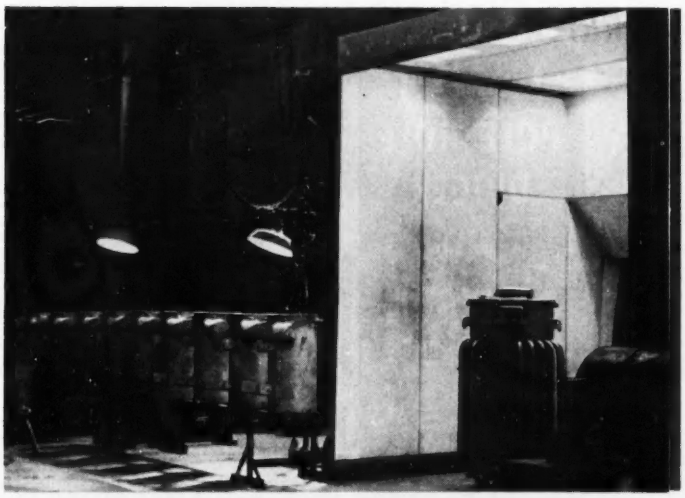
● **Ajax Condenser Co.** Inc. of Chicago has opened a West Coast factory in North Hollywood at 10905 Chandler Blvd.

● **Perfection Stove Co.** of Cleveland has appointed the Afton-Lemp Electric Co. as its appliance distributor in the Boise area.

THE RIGHT "WAR PAINT"

ALMOST every woman knows the right foundation cream, "war paint" such as rouge, mascara, powder and lipstick that will make her a success. In manufacturing transformers the "warpaint" or paint finish is equally important in their operating success. At GARDNER, where transformers are really built to top quality specifications, the paint finish is put on to stay!

In the GARDNER plant shown below, transformers are shot blasted in the cubicle at the far left. This removes scale and oxides and surface-grains the metal for maximum tenacity of the baked enamel applied in the water curtain spray painting booth at the right. In the left foreground are standard GARDNER transformer tanks which have been shot blasted, tested for leaks and ready for painting. This is how GARDNER transformers get their "war paint" that lasts years and years.



★

Special problems are welcome. Our experience is widespread and our production line is flexible. Write for information.

GARDNER ELECTRIC MANUFACTURING COMPANY

FACTORY AND GENERAL OFFICE

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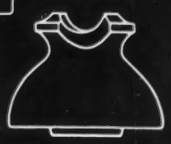
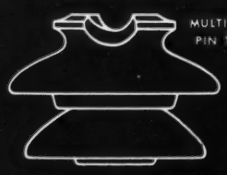
APPROVED FOR R.E.A. USE

SUSPENSION TYPE

SPOOL TYPE



PIN TYPE



MULTIPART PIN TYPE

GUY STRAIN

REINFORCED WIREHOLDER

Write for NEW Free Insulator Catalog

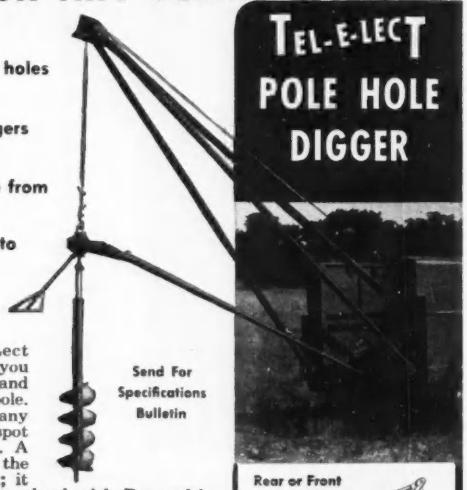
ILLINOIS ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS

Operates ON ANY DERRICK TRUCK

TEL-E-LECT POLE HOLE DIGGER

- Adjustable for clean holes to 8 ft. deep
- Interchangeable augers 8" to 20" diameter
- Drills a straight hole from any truck position
- Easy to use—easy to transport



Send For Specifications Bulletin

WITH the Tel-E-Lect Pole Hole Digger, you use the same truck and crew that sets the pole. You can drill a hole any place that you can spot the pole derrick. A single bolt attaches the digger to the truck; it works suspended from the derrick. Powered by the truck motor through a power take-off shaft, Tel-E-Lect digger is raised and lowered by the winch line. Fits the budget of even the smallest utility or contractor, and quickly pays for itself.

Distributed by: AM. EQUIPMENT & BODY CO., Los Angeles 33
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Rear or Front Mounted

TEL-E-LECT PRODUCTS, Inc.

10,025 MINNETONKA BOULEVARD, MINNEAPOLIS 16, MINNESOTA

NEWS ABOUT PEOPLE

● **William N. Armstrong** has been transferred from chief engineer of the Alamosa plant to chief engineer in the Grand Junction district of Public Service Co. of Colorado to succeed **Charles C. Hormel,** who retired recently. **Edward Callen** will succeed Armstrong at Alamosa. Hormel retired after almost 50 years in the electrical industry. He joined Public Service Co. of Colorado at Denver in 1910.

● **Dale B. Evans** has joined the K. M. Ryals Co. organization as sales engineer to cover northern California. After experience as industrial engineer for Physicist Research Co., he worked for Westinghouse Electric Corp. in Sunnyvale as switchgear engineer and later as sales manager for Okonite Co. in the Bay Area. K. M. Ryals Co. represents Schwager-Wood Corp., Preformed Line Products Co. and Erico Products Inc.

● **William S. Peterson** and **Edgar L. Kanouse** of the Los Angeles Department of Water & Power attended the international power conference in Paris and visited power installations in the United Kingdom, France, Scandinavia, Italy and the Netherlands.

● **Lou Deris** was named vice-president in charge of sales, switchboard and control division, Mullenbach Electric Mfg. Co. of Los Angeles. His former experience has been with the U. S. Army Engineers and Consolidated Vultee.

● **Kenneth W. Browning,** formerly electrical sales engineer with Utah Power & Light Co. at Salt Lake City and lately with the Training Within Industry Foundation, has been appointed training coordinator at Western Pacific Railroad, San Francisco.

● **William O. Kyte,** in charge of advertising promotion for General Electric Co. in Los Angeles, was elected president of Los Angeles Advertising Club.

● **Michael J. Garris,** consulting engineer, formerly with Stiles Clements Architects, has opened his own consulting engineering office at 612 Brockman Bldg., Los Angeles.

● **Jack L. Tindale,** who has been district manager of Anaconda Wire & Cable Co. in the Los Angeles office, has been promoted and transferred to the New York headquarters to be a product manager in charge of sales of bare and weatherproof wire, lead and varnished cable, and cable accessories under Charles Porter, who has been named assistant sales manager of the company. To succeed Tindale in Los Angeles, **Al Tracy** moves from Denver where he has been district manager and his assistant, **Ken Eaton,** is promoted to Denver district manager with **Bill Gaylord** transferred from the Los Angeles office as his assistant. These changes were effective Aug. 15. Tindale was president of Los Angeles Electric Club last year.

● **For efficiently maintaining and operating** Parker Dam power plant and switchyard since Dec. 13, 1942, Joseph Talla, electrical engineer and chief operator at the dam, has received the Department of Interior's commendable service award. He is retiring June 30 after nearly 30 years with the bureau. Talla first worked for the bureau on the Salt River project at Phoenix, Ariz., in 1914 and served for three years, when he left the government. He returned to the bureau in 1928. Before his appointment at Parker Dam he worked at the Minidoka project at Burley, Idaho; Boulder Canyon project; Buffalo Rapids project at Glendive, Mont.; and Kendrick project at Seminoe Dam, Wyo.

● **John Longden,** for many years manager of the Salt Lake City branch of Westinghouse Electric Supply Co., has become special representative of the company since he has accepted executive responsibilities in connection with the Mormon church.

● **Thomas O. Whittaker** has been appointed northern California district apparatus and supply sales promotion manager for Westinghouse Electric Supply Co. in San Francisco by **Charles R. Matthews,** district manager.

● **George E. Zelhart,** mechanical engineer for Fresno office of Pacific Gas and Electric Co., has been elected state president of California Society of Professional Engineers. He succeeds Kenneth L. Harrington of Los Angeles.

● **Earl A. Olson,** sales manager, Idaho Power Co., was chairman of a committee to choose the "Idaho Grassman of the Year."

the DUNCAN HEAVY DUTY FAMILY IS GROWING!

Duncan Type HD Heavy Duty Device

THE DUNCAN family of Heavy Duty Equipment is continually growing in size and acceptance. By the elimination of current transformers for load currents between 100 and 200 amperes, appreciable savings are made in installation cost and mounting space. There is no better method of metering 1-, 2-, or 3-phase 3-wire services. Try these Duncan Heavy Duty combinations on your next installations in this capacity range.

SELF-CONTAINED METERING OF LOADS UP TO 200-AMPERES

. . . For POLYPHASE 1-, 2-, or 3-phase 3-wire installations—The new Type MH-2S 50-ampere meter.

. . . For SINGLEPHASE DEMAND—The Type TF-SE 50-ampere, 240-volt, 3-wire single-phase watthour-thermal demand meter (48 KW).

. . . For SINGLEPHASE—The Type MF-SE 50-ampere, 240-volt, 3-wire meter.

makers of watthour meters for fifty years

DUNCAN

DUNCAN ELECTRIC MFG. CO. LAFAYETTE, INDIANA

There's Longer Life in Pressure-Creosoted

POLES by McCORMICK & BAXTER

Straight, Strong Durable OREGON DOUGLAS FIR

Poles • Piling • Lumber • Ties • Crossarms

- Machine Peeled
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- Immediate Delivery

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ELECTRICAL WEST reaches over 90% of the electrical contractors employing more than 3 people in the 11 Western States—more than 1,000 electrical contractor subscribers at the present time! ELECTRICAL WEST provides Western contractors with 132 pages of editorial material each year. These are pages specifically of interest to contractors, in addition to new product descriptions, new literature reviews and general industry news. That is why leading electrical contractors in the West consistently rank ELECTRICAL WEST with the leading national construction magazine in readership studies.

. . . then you also want

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Most items used by electrical contractors are purchased through local electrical wholesalers. If you're selling electrical equipment and supplies to contractors, you want your sales and advertising efforts to work on wholesalers, too. ELECTRICAL WEST has one or more subscribers in more than 200 of the 220 electrical wholesale outlets in the 11 Western States and Hawaii. These subscribers get at least 72 pages a year devoted to their special merchandising interests. They too, rank ELECTRICAL WEST right beside their own national publication.

16% of the nation's electrical contractors are located in the 11 Western States. The best way to reach this group and the 200 wholesale houses that supply them is in the advertising pages of ELECTRICAL WEST.

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Frank Seiler . . . . Cleveland 15
1510 Hanna Bldg.

Carl Dysinger . . . Los Angeles 17
1111 Wilshire Blvd.

Dick Alcorn . . . . San Francisco 4
68 Post St.

ELECTRICAL WEST

ABC A McGraw-Hill Publication ABP

● **George R. Prout,** general manager for the General Electric Co. at the Hanford Works, Richland, Wash., since 1949, has been transferred to the company's headquarters at Schenectady as vice-president of nucleonics and atomic projects. The appointment was announced as the company centralized all its atomic-energy activities under a new administration setup called the Defense Products Group. **Wilford Johnson,** former assistant general manager at Hanford, has been promoted to Prout's former position.

● **Rhule L. Bell** has been appointed Pacific Coast industrial control engineer for Westinghouse Electric Corp. with headquarters in San Francisco. After receiving his BS degree in electrical engineering from Southwestern Louisiana Institute in 1940, he entered the Westinghouse student training course in East Pittsburgh, Pa. Bell was transferred to the San Francisco office as field engineer in the engineering and service department in 1943, and two years later became consulting and application engineer.

● **Dr. Parker D. Trask,** University of California research engineer, has gone to Peru to conduct a three-month investigation of the possibilities for a large-scale water resources development program there. Engineering studies will be made on problems of water conservation, irrigation, ground water, flood control and potential water power available for industrial development.

● **Clare K. Fulton,** lighting specialist for the Pacific Northwest district of the General Electric Co.'s apparatus sales division at Seattle for the past 2½ years, has been transferred to the light and rectifier department of the company's Lynn, Mass., plant. He has been succeeded by **Don H. Anderson,** formerly at Lynn.

● **Paul W. Jones,** for 33 years Westinghouse Electric Corp. representative to the gearing industry, 29 years of which he spent on the West Coast, retired June 30. A native of Byran, Ohio, Jones received his mechanical engineering degree from Cornell University and joined Westinghouse as a sales engineer.

● **Ken Downing** has been appointed residential representative for Washington Water Power Co. at Pullman, Wash. He formerly operated an automobile electric company at Coeur d'Alene, Idaho.

● **John D. Davis,** recently appointed assistant administrator of the Bonneville Power Administration, has taken up his new duties at Portland. In accepting his new post, Davis gave up the position of deputy administrator of the Defense Electric Power Administration, which he had held since Oct. 1, 1951. Prior to his service with DEPA he was for two years manager of Bonneville's Washington, D. C., office. His earlier work included four years as commissioner of the department of employment security. Davis succeeds **D. Loring Marlett,** who resigned to accept an executive position in private industry.

● **Ivan P. Head,** civil and hydraulics engineer with the Bureau of Reclamation in project investigations and hydrology positions for 16 years, has been named assistant regional planning engineer for the bureau's Region II in Sacramento, Calif. He worked on Colorado River investigations for several years and since World War II has been a member of the hydrology branch in the bureau's Denver office. In his new position, he succeeds **Oliver H. Folsom,** who resigned to work for a private general contracting firm.

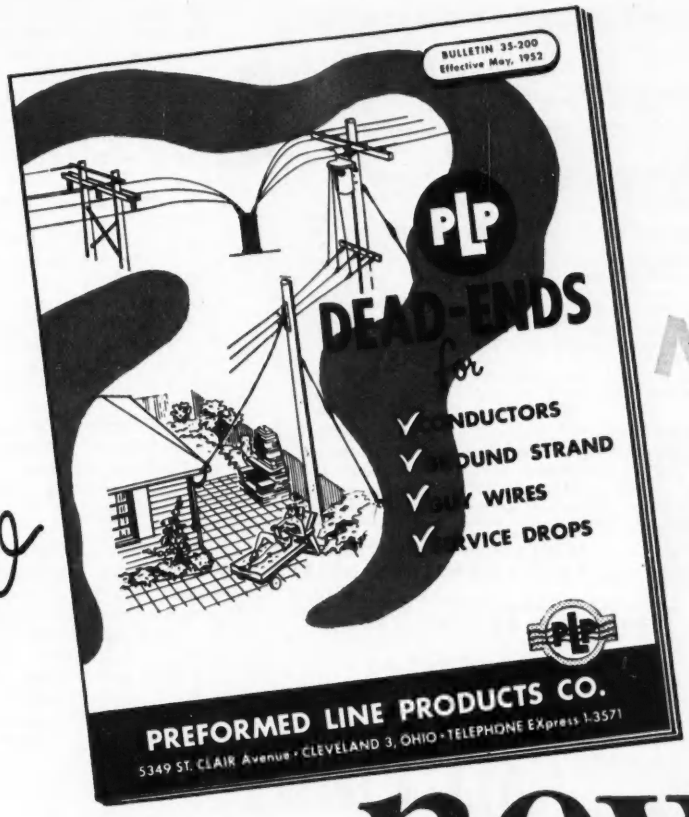
● **Robert S. Caruthers** has joined Lenkurt Electric Co. of San Carlos, Calif., as chief systems engineer.

● **Bert Mills** has been appointed manager of the electrical department of the Hickman Tye Hardware at Victoria, B. C.

● **William S. Peterson,** chief electrical engineer, Department of Water & Power, Los Angeles, and **Edgar L. Kanouse,** transmission system engineer, also of the department, attended CIGRE, the world conference of the power industry held in Paris during June. After attending the meeting, both of the men toured the continent, inspecting the power installations of most every country of western Europe.

● **Percy P. Pine,** engineer in charge of power sales during almost all of the time he was with the San Diego Gas & Electric Co., since 1916, retired recently. He had served on numerous committees of Pacific Coast Electrical Assn.

● **Roy Timmons,** supply salesman in Salt Lake City, left Graybar Electric Co. to become a manufacturer's representative in that area.



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Preformed Line Products Company
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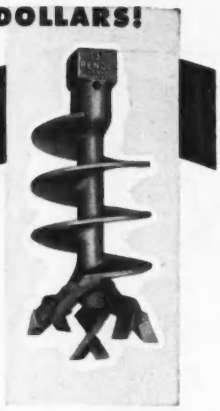

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★ Double-helix cutting head eliminates back-thrust, quickly bores true and clean.

★ Triple-flight single helix carries bigger load of dirt from hole . . . you can complete a hole with less than half the trips down and up!

★ Extra-long auger with small-diameter center shaft leaves plenty of room for dirt and rocks . . . no clogging or jamming!

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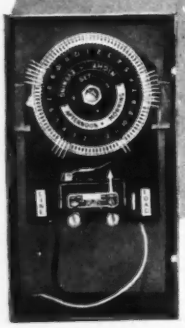

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JEFFRIES TRANSFORMER COMPANY

1710 E. 57th St. Los Angeles 11, Calif.

● **David C. Fulton** has been appointed Pacific Coast machinery electrification manager for Westinghouse, with headquarters in San Francisco. He suceeds **Claude Herbert,** who has taken over special assignment in the district. Fulton was application engineer in Portland before his transfer.

● **George F. Koth** and **Philips B. Patton** were elected vice-presidents of the Lenkurt Electric Co., San Carlos, Calif. Patton joined Lenkurt as field engineer in 1948, after service with Farnsworth Television and Radio Co. Koth had been factory manager of the Acme Electric Corp., Cuba, N. Y., before going with Lenkurt as production manager in 1946.

● Appointment of **Jack Canady** as sales promotion manager for Palmer Mfg. Corp. of Phoenix has been announced by **Oscar Palmer,** president of the firm.

● **Melville N. Clark,** East Bay division electric superintendent for Pacific Gas and Electric Co., retired recently after 31 years with the company. **C. R. Machen** has been transferred from Chico to take over Clark's duties. **George S. Brand** has been appointed De Sabla division electric superintendent succeeding Machen.

● **William E. Dawson** of San Francisco recently celebrated 50 years of service with Pacific Gas and Electric Co. and its predecessors. He is one of half a dozen PG and E employees to reach the half-century mark.

● **H. A. Ashton,** Nelson, B. C., has been transferred by the Northern Electric Co. to Victoria, B. C. He went to Nelson from the Edmonton branch in 1949. **E. Nichols** of the Vancouver branch has been moved to Nelson to succeed Ashton.

Deaths

● **W. N. Clark,** former president of the Southern Colorado Power Co., died recently in Pueblo. Mr. Clark was a native of Paxton, Ill., and moved to the Central City mining district in 1896. He attended the Colorado School of Mines in Golden and was graduated with a degree of electrical engineering in 1898. He served with the Mountain States Telephone & Telegraph Co., the former Denver Gas & Electric Co. and the Pikes Peak Power Co. For 20 years until retirement in December 1950 he was president of Southern Colorado Power Co.

● **Fred C. Hanker,** former Westinghouse engineer, died at Stanford University, Calif., where he had been lecturing since his retirement in 1935.

● **Charles Elliott,** 67, retired manager of the Nampa, Idaho, office of Idaho Power Co., died Aug. 1 in Boise.

● **James Charles Murphy,** 61, of Pittsburgh, engineer for Westinghouse Electric Corp., died suddenly Aug. 6 in Seattle while on a business trip.

● **Col. John James Burton,** sales manager for B. C. Electric Co., died following a heart attack at Vancouver. He had been with B. C. Electric for 32 years.

● **Sanford Stephenson,** 55, manager of wire and wire products for Bethlehem Pacific Coast Steel Corp. since 1935, died Aug. 18 at his home in Burlingame, Calif.

● **Charles G. Smith,** 41, electrical engineer for the Palo Alto, Calif., electric department, drowned Aug. 26 as he struggled to save his family after a boating accident.

● **Walter Edwin Mills,** 75, retired electrical engineer of Seattle, died there recently. Born in Green Bay, Wis., he moved to Seattle with his parents in 1889, was a refrigeration engineer in Alaska for 10 years before joining Puget Sound Power & Light Co. in 1916. Mr. Mills worked for the company until his retirement six years ago.

● **J. Lester Perry,** former president of Columbia Steel Co., died recently in Pittsburgh. He was 71 years old.

● **Clarence R. Hunt,** former Pacific Coast manager for Robbins & Myers, died in Palo Alto after a long illness. He spent all his business life in the electrical industry and was associated with General Electric Co. in Chicago before moving to California.

● **Irving W. Murray,** for many years with Gilson Supply Co. of Oakland, died Aug. 3 in that city.

● **Frank C. Yerkes,** retired former district manager of Public Service Co. of Colorado at Sterling, died recently in Denver.

● **Nils E. Erickson,** 34, advertising and promotion manager for the Sunset Electric Co. at Seattle died recently after a month's illness.

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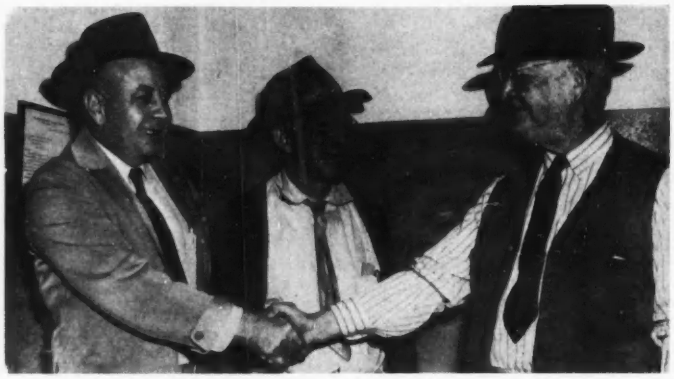
PROFILES

Power Men Win Honors, Promotions

Tom Clarke, left, of Northern Electric Co. receives an honorary membership certificate in the Northwest Electric Light & Power Assn. from J. H. Steede of B. C. Electric Co. A former Vancouver man, Clarke is now with Northern Electric in Montreal. Presentation of the certificate took place on a recent visit to Vancouver



Southern Colorado Power men happy in their recent promotions include Howard Reader, now chief design engineer, Fred Morgan, who stepped up to superintendent of the Pueblo plant when E. R. Weber, at right, was made superintendent of production there

Also promoted at Southern Colorado Power were George Devine, to superintendent of mechanical maintenance, Leonard Meek, to assistant superintendent of the Pueblo plant, and H. M. Sims, to superintendent of electrical construction and maintenance

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—ESPECIALLY WITH 3500 HP AT STAKE

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GET THE INSIDE STORY — For more information about large two-pole motors, ask your A-C representative for Bulletin 05B7550. Smaller cage motors are described in Bulletin 51B7693. Allis-Chalmers, Milwaukee 1, Wis.

Here are Some of the Features

- Separate steel balancing rings to provide dynamic balancing without weakening the end rings.
- *Dew-drop* bars that give better performance and stay tight in the rotor core slots.
- Forged end rings, drilled to receive the cage bars.
- Oxygen-free copper or deoxidized copper-base alloy bars and end rings to prevent embrittlement from silver-brazing.
- Air distribution arrangement that eliminates hot spots in both the stator and the rotor.
- Ring-oiling adequate for prolonged emergency operation without forced-feed oiling.
- Equalizing air pressure chambers in the bearing housings to positively keep oil out of the motor windings.

ALLIS-CHALMERS A-C ALLIS CHALMERS

Cole Electric Co.

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34,500 volts—600 amperes—Type O-2
Vertical break. Three pole. Single throw. Group operated.
One pole shown.
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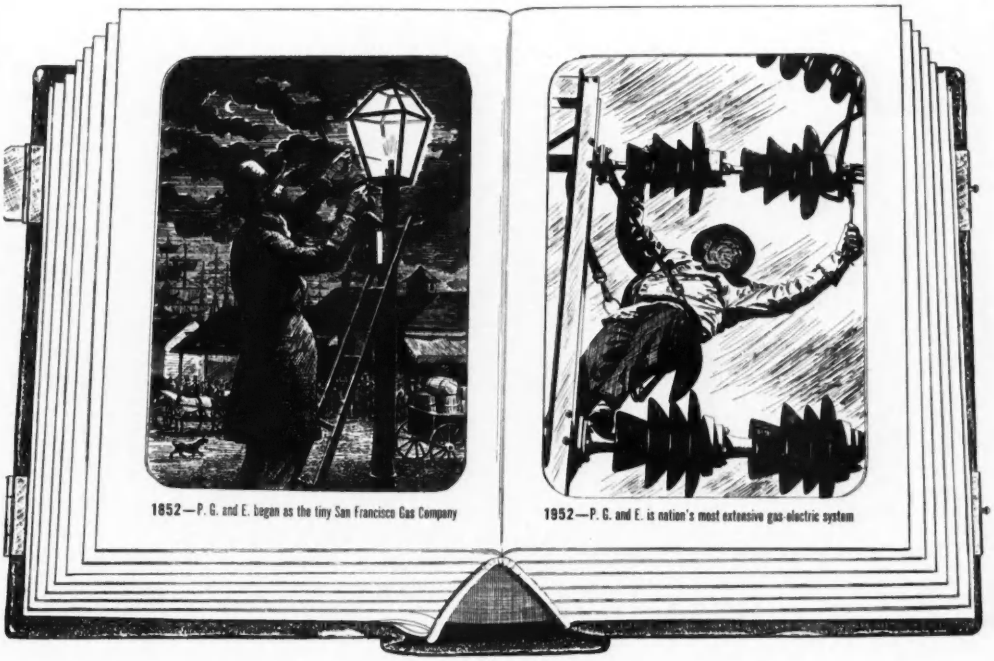

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Any list of the outstanding leaders in the West's electrical industry must include a large percentage of men who have taken an active part in P.C.E.A. activities over the years and who are, in most cases, still taking an active part.

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